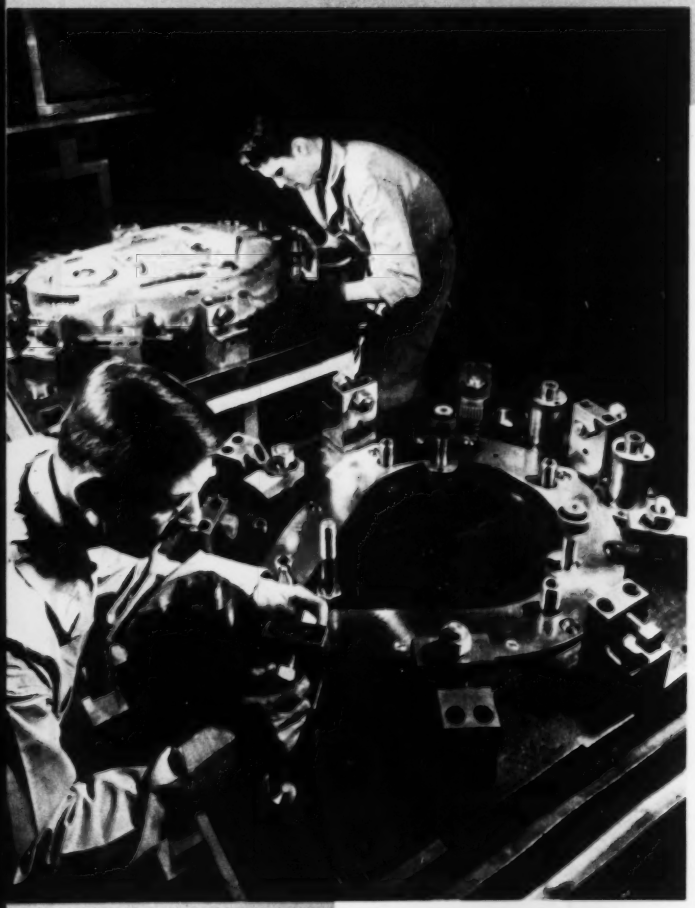
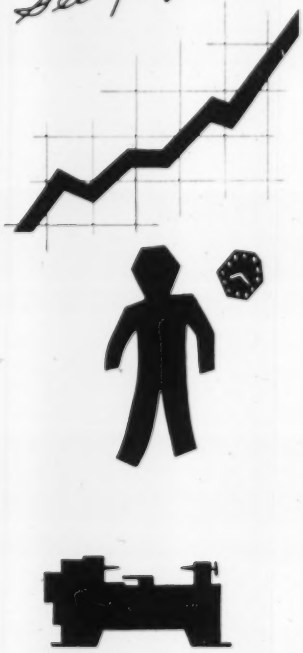
MARCH 10, 1952

STEEL

THE WEEKLY MAGAZINE OF METALWORKING



Tool Engineers—
See page 106



More Unit PRODUCTION per MAN-HOUR per MACHINE

TOOLING: Versatility Harnessed to a Machine, p. 108

ASTE Industrial Exposition Program, p. 123

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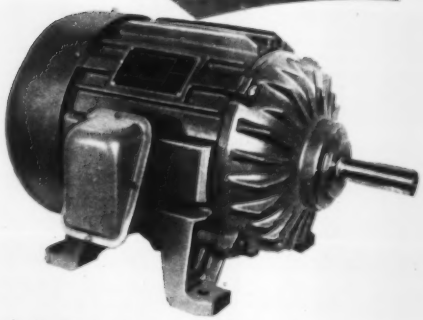
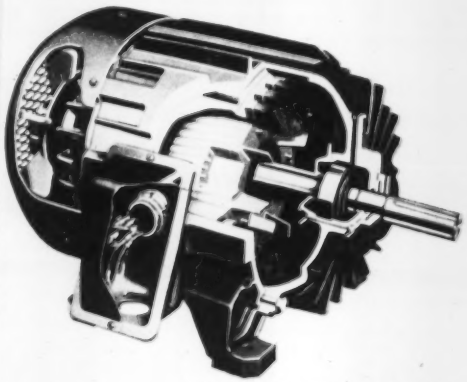
Totally-Enclosed Fan-Cooled

Look Outside



Greatly increased radiating area means greater cooling efficiency. More important, cooling efficiency stays high, regardless of operating conditions. There are no enclosed external air passages to clog and cause overheating. If only dirt sticks, just wipe or blow it off. No matter how bad operating conditions are, this motor can be easily kept clean and cool running. Electrical parts are protected against corrosive atmospheres by cast iron yokes and end housings.

Look Inside



Double-shielded, heavy-duty ball bearings require no maintenance in ordinary service under most conditions. However, they can be lubricated without disassembly if required. Double shielding prevents over-lubrication, leading cause of bearing trouble. Rotating seals, where shaft extends through housings, keep dirt and moisture out of bearing chambers. Die cast rotor and interphase insulation are further assurance of long life and low maintenance.

See WHY THIS IS YOUR BEST MOTOR BUY

HERE IS A MOTOR that is different from conventional TEFC motors, built with an entirely different cooling system that gives you big savings in lower maintenance, more continuous service and less trouble in the toughest locations. Clogging can easily be prevented in the Allis-Chalmers Type APZ TEFC motor since areas that might collect dirt are exposed and easy to clean.

GET DETAILS NOW — *Ask your nearby Allis-Chalmers Authorized Distributor or District Office for more complete information on this high performance TEFC motor. Or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for Bulletin 52B7225.* A-3578

Texrope and Vari-Pitch are Allis-Chalmers trademarks.

Sold . . . Applied . . . Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters, push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types from ½ in. to 72 in. discharge and up.

ALLIS-CHALMERS A-C

Shafts for hydroelectric installations. The one at the left is 18 ft long; the other, 24 ft. Diameter of axial bores, 12 in.

Chipper disc used in wood-pulping. OD, 175 in.; ID, 20½ in.; thickness, 10½ in.

HERE ARE SOME *Bethlehem* HEAVYWEIGHTS

There's plenty of tonnage packed together in these big forgings . . . 35 tons in the disc, 100 and more in the two flanged shafts, and better than 12 in the boring mill spindle. From a standpoint of weight, that heavy-walled spindle is the baby of the group, but it's still a husky forging.

Almost any time you'll find pieces like these on the floor of our shops. But the heavyweights are only one class of forgings produced in great volume at Bethlehem. We make the little fellows, too—some so small you can cup them in your hand.

And we're equipped to do a good machining job—rough or finish. Bethlehem's machine shops have been, for years, among the largest and finest in the industry.

Call us whenever a forging job comes up—whether it's heavy tonnage or something in one of the lighter classes. Rest assured, we'll always do everything possible to help meet your needs.

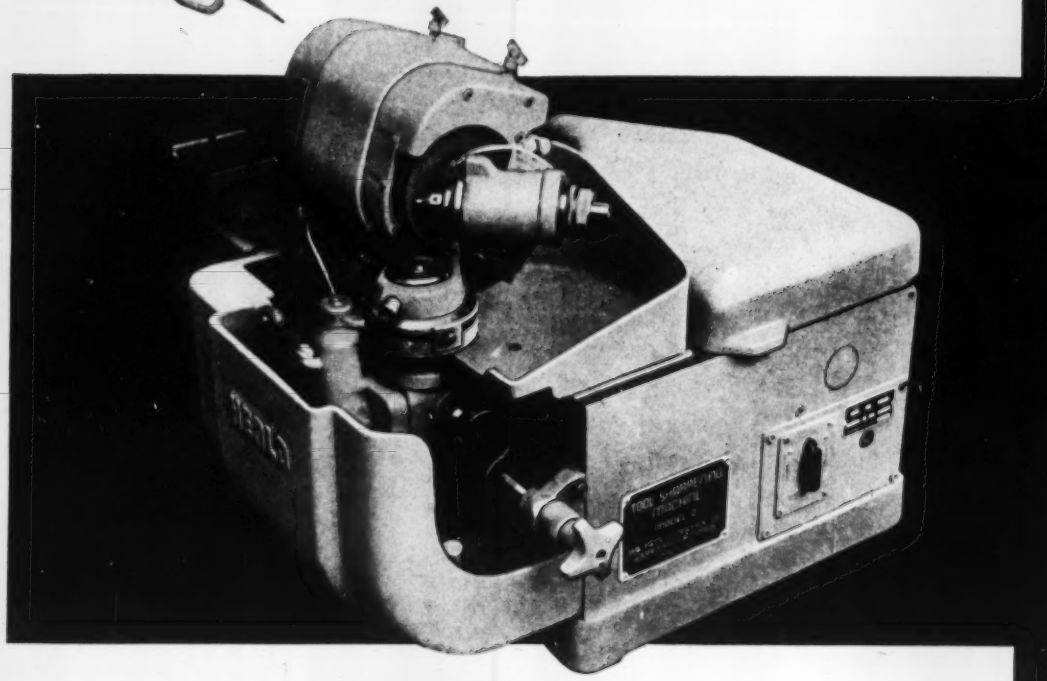
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

Bored forging 22 in. OD by 14 in. ID by 35 ft long. Carbon steel, normalized and annealed. Finish-machined and polished to close tolerances.

Here's How Heald helps you get LONGER TOOL LIFE



Automatic lapping makes cutting tools last 2 to 4 times longer

Because it does the whole job *automatically*, the Heald Model 2 Tool Sharpening Machine eliminates the human errors that are unavoidable when cutting tools are ground by hand. Up to five different angles can be lapped simultaneously and in a single setting. You get exact duplication of tool shape *every time*.

This means longer tool life—more work pieces per sharpening—less machine down time. Still more important, it means *peak production* from your precision-built Heald Bore-Matics.

Ask your Heald representative about this time-saving, labor-saving Tool Sharpening Machine.

HEALD

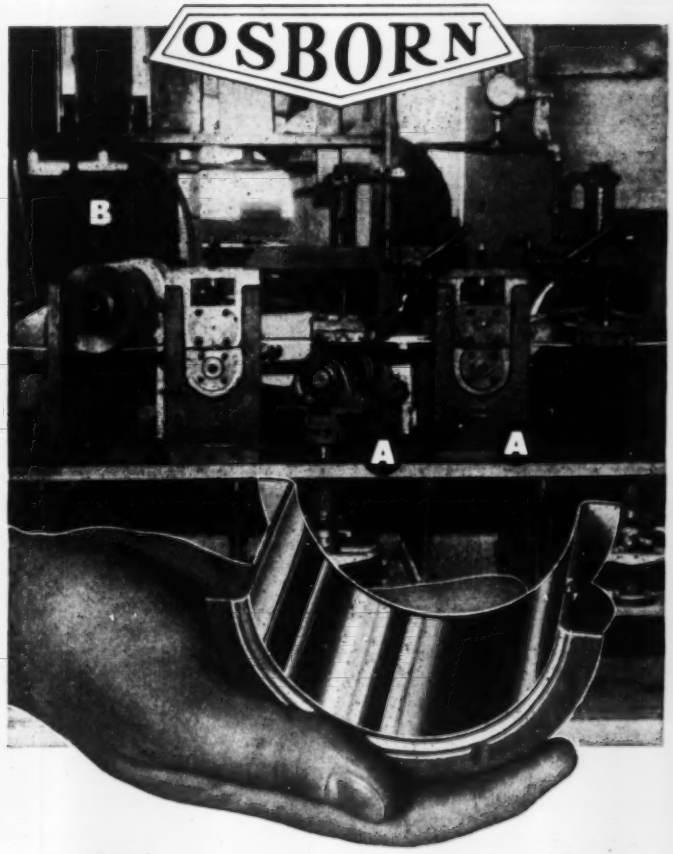
Heald machines speed the nation's production

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Branch Offices Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

OSBORN



Will "automatic" ideas like these cut your costs?

THIS machine does two jobs at one time . . . does them thoroughly by power brushing . . . at the push of a button.

Perhaps a similar brushing method can help cut *your* costs, boost *your* production and improve the quality of *your* products.

The machine developed with the help of the **O**sborn **B**rushing **A**nalyst cleans steel-backed, babbitt-lined strip for production of automotive sleeve bearings. With the strip traveling continuously, Osborn Master Wheel Brushes (A) remove all dirt, rust and metal particles from the steel surface. Osborn Monarch Sections (B) then thoroughly clean the babbitt side.

This is typical of the cooperation which your **O**sborn **B**rushing **A**nalyst can give *you* to solve problems of product cleaning, burr removal, roughing, polishing and finishing. For help, call or write *The Osborn Manufacturing Company, Dept. 654, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Osborn Brushes

OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

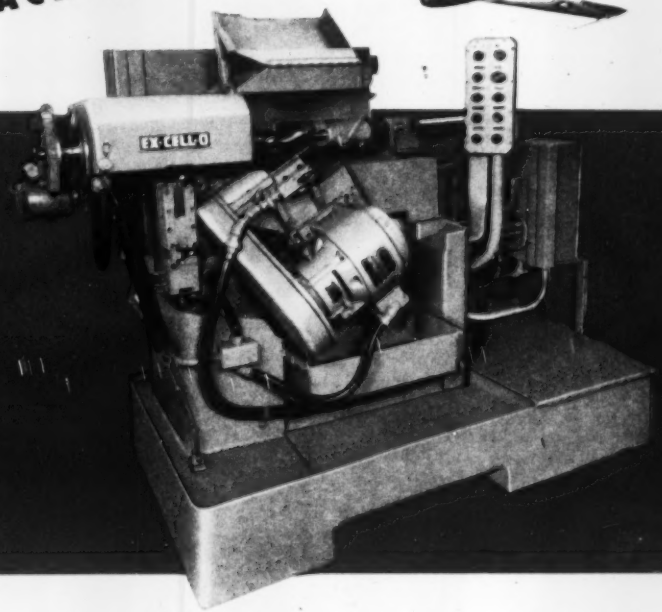
SAVES 12 MEN. This is one station of a five-station rotary automatic machine equipped with Osborn power brushes that removes burrs and sharp corners of clutch disc teeth. Formerly done by hand. Saves 12 skilled men.

9 TIMES AS FAST. This simple pipe fixture provides the means of cleaning threads of set screws. Can be applied to many cylindrical parts. Time was cut from 18 seconds to 2 seconds with this Osborn brushing idea.

10 TIMES AS FAST. This shows two gears before and after deburring by a new Osborn power brushing method. Note smooth uniform results. Time was cut from 3 minutes to 18 seconds.

EX-CELL-O

PRODUCTION-PROVED MACHINE MILLS JET BLADES



XLO

EX-CELL-O'S COMPLETE LINE OF STANDARD MACHINES FOR FINISHING JET BLADES:

STYLE 85, FOR GRINDING THE ROOT FORM

STYLE 86, FOR MILLING THE AIRFOIL

STYLE 87, FOR GRINDING THE AIRFOIL

STYLE 88, FOR POLISHING THE AIRFOIL

MILLS COMPLETE AIRFOIL, *INCLUDING LEADING AND TRAILING EDGES*—AUTOMATICALLY

Here is a production-proved machine for automatically milling the complete airfoil form (including leading and trailing edges) of jet engine compressor blades. An outstanding feature is the use of back rests that support the blade rigidly throughout each cutting stroke to prevent deflection of the blade by pressure of the milling cutter.

The Ex-Cell-O Precision Profile Miller, Style 86, is hydraulically operated and fully automatic except for loading, unloading and pressing the start button. The airfoil form is generated by a master cam made from the engineers' glass layouts. The work travels lengthwise across the milling cutter and is indexed after each cutting stroke, the indexing and cutting being repeated until the part has rotated 360 degrees.

For further information and detailed specifications on blade finishing machines write, wire or phone to Ex-Cell-O in Detroit.

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS
DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

51-J8

STEEL

The Weekly Magazine of Metalworking

VOL. 130 NO. 10 **MARCH 10, 1952**

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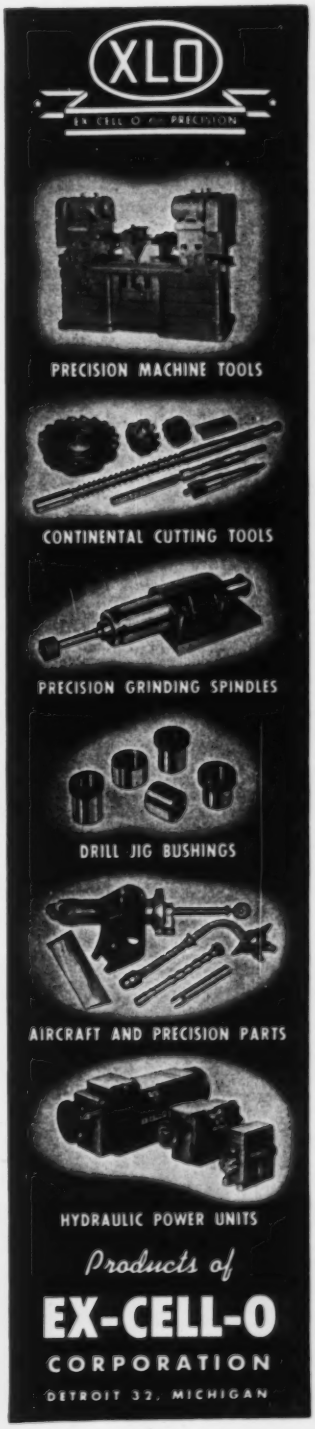

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Here is the way it works. Let us have a talk with you about your industrial oil requirements. Then, on the basis of that discussion, we will recommend an oil for the job you want done better, faster, and more economically. Then you make a trial of our oil on your machines. If the results are what you demand, we're both happy.

If not, however, our laboratory men will work with your problem—formulating, blending, testing until they finally develop the right oil for the job.

You may ask who's going to pay for this work. The answer is that Pelron will, until we develop a solution to your problem. Then you only pay for each drum of oil made to the formula developed to do your work better.

Call us in today. Let us prove how our service can help you!

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INDUSTRIAL OILS AND CHEMICALS FOR BETTER PRODUCTION AT LOWER COST

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Behind the Scenes...

Prof. Shrdlu Holds a Quiz

Want to test your industrial I.Q.? Fill in the 15 blanks below in this column's semiannual quiz. All data relate to items in STEEL's issues of Feb. 25 or Mar. 3. Jot down your answers on a postcard and send it in. Any grade of 80 or better wins our honorary B.T.S. degree, complete with sheepskin. It's ideal for framing and hanging on your office wall. No cribbing allowed.

1. Westinghouse expects _____ problems to be its toughest hurdle in 1952.
   a. production
   b. refrigeration
   c. sales
2. Steel and aluminum controls may end by—
   a. next Dec. 31
   b. next Feb. 1
   c. next Mar. 1
3. Steel ingot capacity by early 1953 will be about _____ million tons.
   a. 110
   b. 120
   c. 130
4. Erie Mining Co.'s proposed new taconite plant is the _____ facility planned for full commercial production.
   a. only
   b. second
   c. last
5. Estimated aluminum supplies in 1952 will be _____ tons.
   a. 1,365,000
   b. 136,500
   c. 13,650,000
6. Aging time of cheese may be speeded up by a trace of _____
   a. manganese
   b. copper
   c. hot water
7. As reported last week, the steel operating rate was _____
   a. 91 per cent of capacity
   b. 101 per cent of capacity
   c. 2,101,467 tons
8. Television sets 15 years from now may be powered by _____
   a. room heat
   b. static electricity
   c. atomic energy
9. Cobalt _____ offers inspection advantages.
   a. 50
   b. 60
   c. 70
10. Nonferrous companies plan to spend _____ on domestic mines by the end of 1955.
    a. $200 million
    b. $2 billion
    c. $20 billion
11. Output of ductile iron in the U.S. and Canada jumped to more than _____ tons in 1951.
    a. 5 million
    b. 500,000
    c. 50,000
12. Of all the types of iron and steel scrap, the _____ grades are now the easiest to get.
    a. cast iron
    b. soft
    c. open-hearth
13. Machine tool builders can expect _____ worth of new orders in 1952.
    a. $1 billion
    b. $100 million
    c. $10 billion
14. Main protagonists in a coming battle for eastern steel markets will be _____
    a. Kaiser and Sharon
    b. Phil Murray and Ben Fairless
    c. U.S. Steel and Bethlehem
15. The number of manufacturing companies today is _____ it was in 1948.
    a. the same as
    b. less than
    c. more than

Puzzle Corner

First in with the answer to the problem of disposition of troops in the Feb. 25 issue was Eyvonne A. Cochrane, a research assistant at Ohio State University. At Day were 32 units; at Night, 4 units; at Morrow, 64 units.

Two groups of boys were playing volley ball in a school gymnasium. The captain of one group said to the other captain, "Why not let one of your men come over on our side so that the sides will be even?" The other captain countered, "Let me have one of your men and then I'll have twice as many as you." How many on each team?

Shrdlu

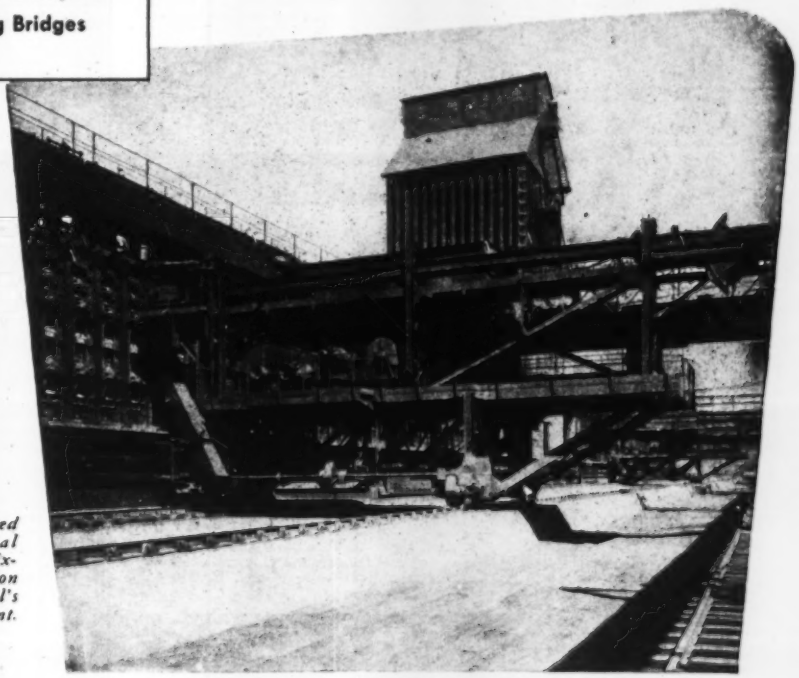
(Metalworking Outlook—Page 67)

Wellman will build it

- Coke Guides
- Coke Pushers
- Coke Quenching Cars
- Door Extractors
- Door Machines
- Coal Charging Larries
- Revolving Car Dumpers
- Coal Handling Bridges

Wellman Coke Pushers

for the Modern Coke Plant



Wellman Combined Coke Pusher, Coal Leveler and Door Extractor in operation at Bethlehem Steel's Lackawanna Plant.

● Many of the world's most modern byproduct coke oven plants are Wellman equipped. The Wellman Engineering Company's more than half-century experience in building heavy machinery guarantees sound design and expert construction. Wellman equipment provides peak economy, maximum safety and trouble-free performance under a wide variety of operating conditions. For conservative, reliable recommendations on your heavy equipment, phone or write:

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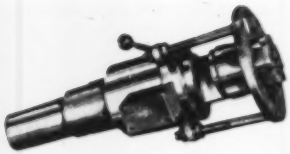
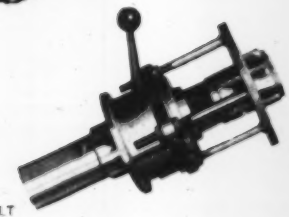
LANDIS Threading Tools

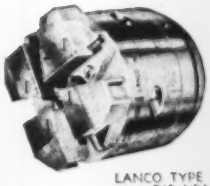
A.S.T.E. Show Booth 1918



STYLE LL
RECEDING
COLLAPSIBLE TAP



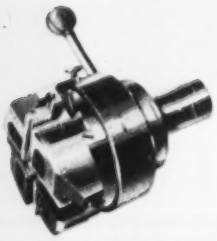
STYLE ALT
COLLAPSIBLE TAP



LANCO TYPE R
DIE HEAD

• TAPS

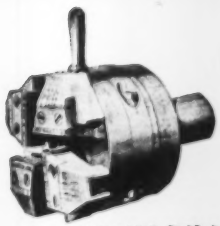
The ALT Collapsible Tap for producing parallel threads. The LL Receding Chaser Collapsible Tap for tapered threads. Both have a wide diametrical range through use of detachable heads. Either can be used as Rotary or Stationary. Special Taps are available.



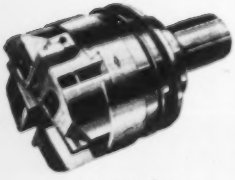
LANDMATIC TYPE H
DIE HEAD

• DIE HEADS

The Lanco for Threading Machines, Landmatic for Turret Lathes, and the Landex for automatics. The Heat Treated R, F, and J types for economy, wide range coverage, quick set-up changes, and oversize capacity. The Hardened and Ground VV, H, and LL types for work on which extreme accuracy and maximum production are of prime importance.



LANDMATIC TYPE F
DIE HEAD

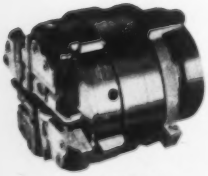


LANDEX TYPE LL
DIE HEAD

• CHASERS

All Landis Die Heads use Landis Tangential Chasers featuring interchangeability, natural cutting clearance, permanent throat, useable for 80% of their length, right- and left-hand thread with same chasers, and changeable rake and lead angles.

LANDEX TYPE J
DIE HEAD



LANCO TYPE VV
DIE HEAD

THE LANDIS
TANGENTIAL
CHASER

LANDIS Machine COMPANY

WAYNESBORO • PENNA.

STEEL

THE VEHICLE OF DEFENSE

Without steel there would be little or no progress in rockets and in guided missiles.

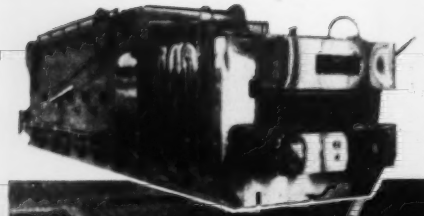
The usefulness of these wonder-weapons is well established. The need for them—now—is well known.

America's program for guided missiles and other armament imposes a herculean task on the steel-makers of the nation. But the response in America's mines and mills, in America's furnaces and forges is herculean, too.

Weirton Steel Company, pledged to participate in defense measures in any way and to any required degree, is supplying steel on approved allocation to speed the stockpiling of America's mightiest missiles.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION



Automatic "Meyer Dumore" bottle cleaning machine made by the George J. Meyer Co., Cudahy, Wis., handles 300 bottles per minute.

Split-second Nelwelding one of about two hundred Nelson granular flux-filled studs used to secure the equipment's component parts. Studs have delivered 100 per cent satisfactory service over a 5-year period.

HOW TO PREVENT LEAKS *and Cut Fabrication Costs!*

Automatic bottle cleaners and pasteurizing machines operate under long, hard use and must be built to perform without leaks or other failures. That's why a leading producer of these machines relies on Nelson end-welded studs to secure the equipment's component parts—bearings, coils, drain cocks, screens and cover plates. Over a 5-year period, Nelwelded studs have delivered 100 per cent satisfactory service.

Substantial reduction in fabricating time and cost is another highly important Nelweld contribution to the building of this equipment. Nelweld has eliminated slow and costly drilling and tapping operations, together with the difficult manipulation of large panels. The lightweight Nelweld gun is merely carried to the erected work and studs quickly installed at the most advantageous stage of production.

If your manufacturing process involves the fastening of steel or any other material to steel, it will pay you to investigate the efficient Nelweld method.

For complete information on Nelweld advantages as applied to your fastening problems, contact the nearest Nelson office or write Department S-5, Lorain, Ohio.

Fasten it Better...at Less Cost, with NELWELD

NELSON STUD WELDING

DIVISION OF GREGORY INDUSTRIES, INC., LORAIN, OHIO

STEEL

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MORE CHIPS PER TOOL
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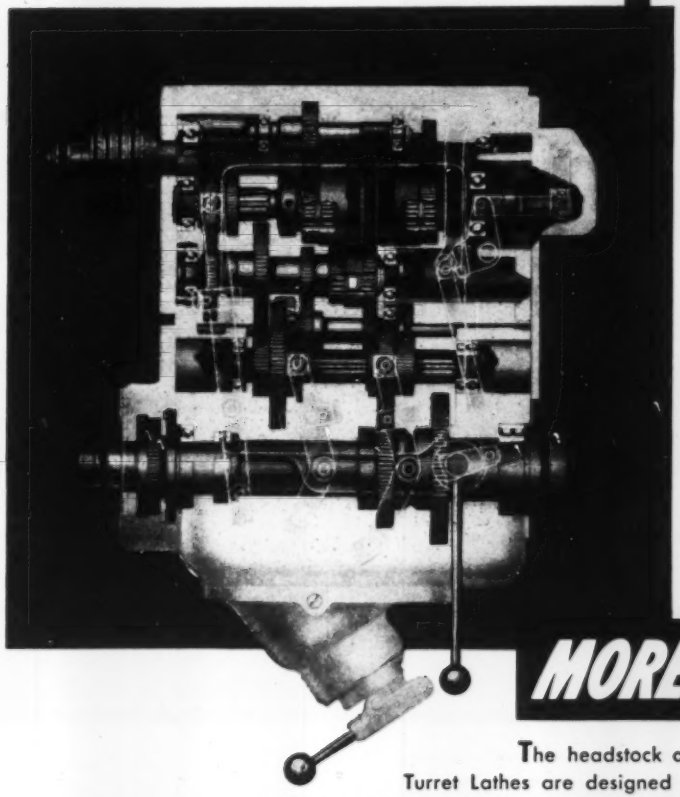


MORE POWER TRANSMISSION!

The headstock and transmission of all J & L Turret Lathes are designed and built for silent, smooth power transmission under the most exacting conditions. Anti-friction bearings are used throughout. The front spindle bearing is preloaded to take much heavier loads than will be encountered in actual service. Heavy cuts can be taken at high or low spindle speeds — or light, accurate finishing cuts can be taken at high spindle speeds, without readjustment. All gears are alloy steel, precision finished.

P.S. *You get all the horsepower you need when you want it. Write to Dept. 710 for Catalog.*

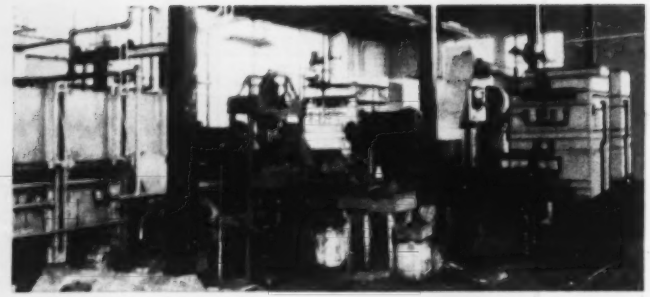
"World's most accurate and powerful turret lathes"

RAM TYPES: Bar, 1½" to 4½", Chuck, 10" to 12". SADDLE TYPES: Bar, 2½" to 5", Chuck, 12" to 18".

JONES & LAMSON

Machine Tool Craftsmen Since 1835

JONES & LAMSON MACHINE CO., Springfield, Vt., U.S.A. J&L TURRET LATHE DIV.



Niagara Aero Heat Exchanger quickly pulls down the initial peak load of heat in quenching . . . and saves cooling water

Accurate control of quench bath temperatures and quickly effective capacity to handle the initial peak load of heat in quenching prevents production set-backs, increases the output of your heat treating department, prevents oil fires, saves you losses from rejected parts.

Niagara Aero Heat Exchangers give you this control in both furnace and induction hardening methods. They prevent both over-heating and over-cooling of the quench bath. Hundreds of heat treaters know they prevent many troubles, constantly improve quality and increase production.

They quickly pay for themselves by saving cooling water coils and extend your quench capacity without extra water or cooling tower.

Write for Bulletin #120 giving complete information.

NIAGARA BLOWER COMPANY

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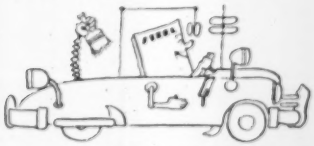
Experienced District Engineers in all Principal Cities of U. S. and Canada

LETTERS
TO THE EDITORS

1952 Model Gadgets with Car



We are unable to understand the conflicting statements in your "Mirrors of Motordom" (Feb. 18, p. 79) with most of the rest of your articles.

You state that many dealers are up to their 1946 tricks again, and indicate that they will not sell a car without piling on accessories, etc. From what I have experienced, most manufacturers would kiss you, or do most anything to get you to buy a car.

H. M. Reynolds
Renite Co.
Columbus, O.

I think it would be well for Mr. Tuttle (H. C. Tuttle is STEEL's Detroit Editor) to make some investigations before he writes an article such as this . . . . He'd better go out and talk to the dealers . . .

Roy Docherty, manager
Standard Motor Co.
Butler, Pa.

• *The article was not intended to leave the impression that new passenger cars are selling like hot cakes as this is not the case. The fact is that some dealers are acting as though a sellers' market exists. These men are gambling; risking no sale now on the expectation they can cash in when the anticipated spring buying rush materialises. Mr. Tuttle did make the rounds of car dealers and found a "take it or leave it" attitude on the part of many dealers in low, medium, high price car lines.*

Semantics of Chemistry

I call to your attention what is probably the most misspelled word in chemistry—phosphorus. There seems to be an idea that "phosphorous" is an adjective meaning phosphorus containing. But, phosphorous is only correct as designating the valence of the element in a compound as opposed to the higher valence designated as phosphoric.

John Howe Hall
Swarthmore, Pa.

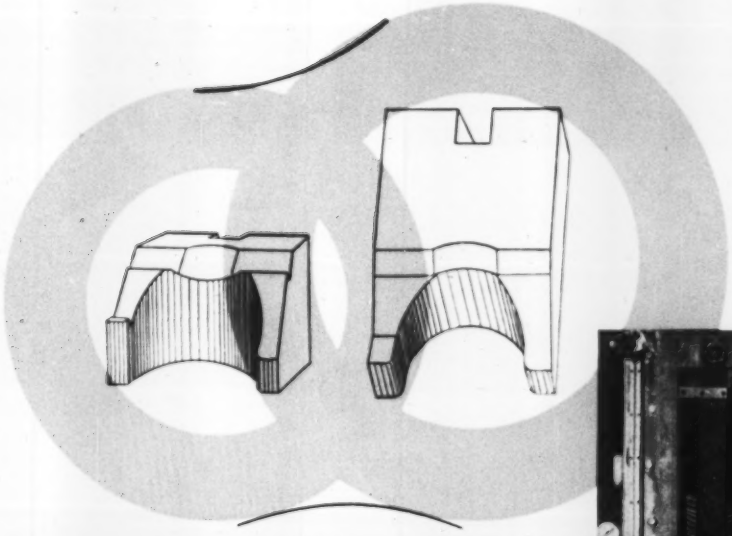
• *We're correct now.*

Patent Should Be Noted

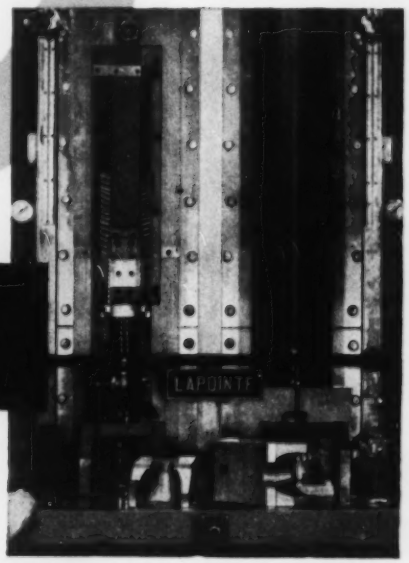
We read with much interest the article "Insulation Lengthens Skid Tube Life" (Feb. 18, p. 101).

In fairness to your readers who may wish to use this method of insulation, it should be noted that the construction described in that article is fully covered by patent and that all applications of this construction will have to be authorized by a license under this patent secured from Surface Combustion Corp. to avoid a liability of infringement.

C. Cone
chief engineer
steel mill division
Surface Combustion Corp.
Toledo, O.



BLENDING RADII? BROACHING'S BEST!



Take this 90mm. breech block, for example. It weighs 100 pounds and is of alloy steel. The shell clearance contour, while not extremely critical in dimensions, has two vital requirements:

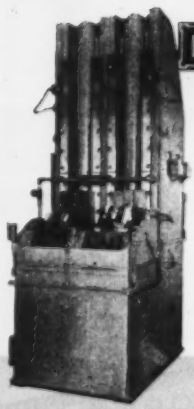
A perfectly blended radii

B extra smooth finish

Obviously, broaching is the perfect answer to both specifications . . . and you get these results time after time, on every piece. No scrap, no rejects, no re-work.

LAPOINTE DOUBLE RAM VERTICAL *Broaching Machine shown here is 25 ton, 66-inch stroke with special in-and-out fixtures and special tooling. It is built in ten sizes ranging from 3 to 25 ton, and strokes from 30" to 90". A folder giving complete data on all broaching machines of this type is available on request.*

Ask for Bulletin DRV-3.



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equipped with fixtures and tools that have been engineered for a particular job give you repetitive accuracy and production speedup.

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THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES

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"MORSE TAPS?

Sure – how do you want 'em . . . straight flute . . . spiral flute . . . or spiral point?"

For regular shop practice, Morse Straight-Fluted Taps are the answer in most materials.

But on "stringy" ferrous materials where straight-fluted taps won't cut clean threads . . . get shear-cutting, Morse Spiral Pointed Taps that push the chips ahead and *out.*

And if those bulky, non-ferrous chips are hard to remove . . . then get Morse Spiral Fluted Taps that simplify chip removal problems by drawing the chips out of the hole.

All these three types of Morse Taps have ample rake angle to handle a wide variety of materials. And all are available in fractional or machine-screw sizes, with one or more chamfers. So see your Morse-Franchised Distributor today about the right Morse Taps for *your* work.

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NEW BEDFORD, MASS.
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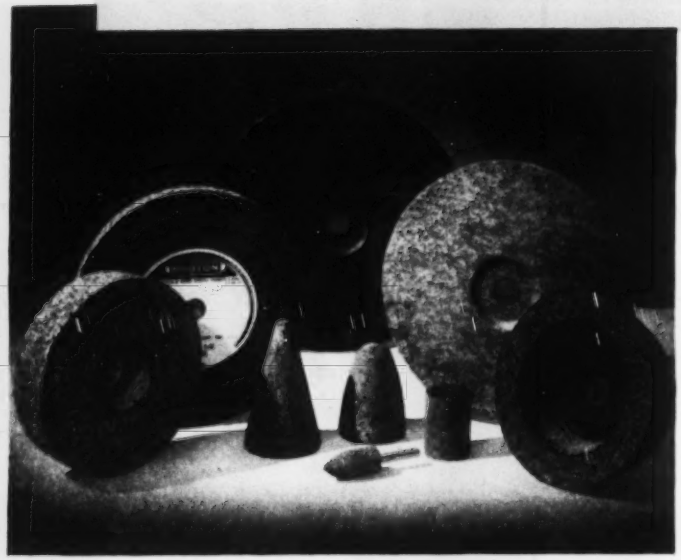
Warehouses in New York, Chicago, Detroit, Houston, San Francisco

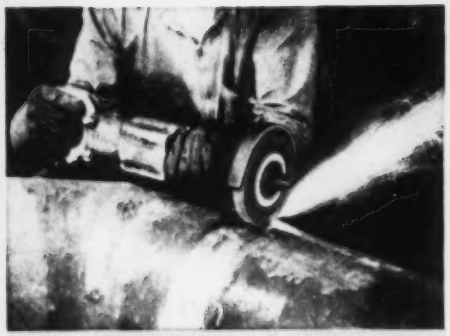
MORSE
Cutting Tools

How Much Will These Norton Wheels Cut Your Weld Grinding Costs?

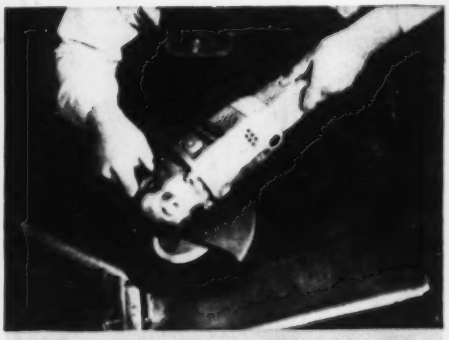


YOU'LL BE SURPRISED at how much Norton portable grinding wheels will cut your costs. No other wheels *hug that work* so closely . . . because no other wheels are so uniform, so well balanced. That means more continuous contact with the work . . . more metal removed per man-hour. Try Norton portable grinding wheels and see for yourself.

Ask your nearby Norton distributor about cost-cutting Norton portable grinding wheels. He's listed under "Grinding Wheels" in your classified telephone directory. Or write direct to Norton Company, Worcester 6, Mass. Distributors in all principal cities. EXPORT: Norton Behr-Manning Overseas Inc., Worcester, Massachusetts, New Rochelle, New York.



NORTON WHEELS ON YOUR PORTABLE GRINDERS — straight and cup — mean lowest grinding costs on your heavy duty jobs because they combine fast cutting action with long life. And they do their work with a very minimum of operator fatigue.



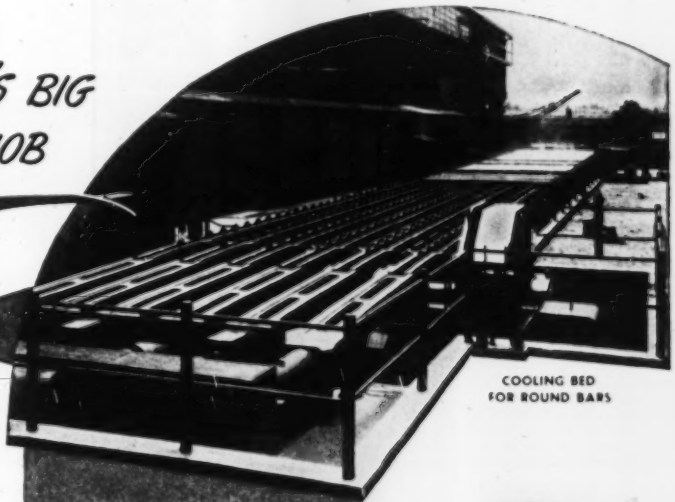
NORTON REINFORCED HUB WHEELS are the safest, most durable weld grinding wheels you can use. And the two types — the rigid BD and the more flexible BFR — make it possible to handle anything but the more severe jobs.

NORTON ABRASIVES

Making better products to make other products better

Y&M makes "what it takes"

FOR INDUSTRY'S BIG PRODUCTION JOB



COOLING BED FOR ROUND BARS

Y&M Products

- PARALLOY ROLLS (PINCH, COILER, TENSION, STEEL MILL)
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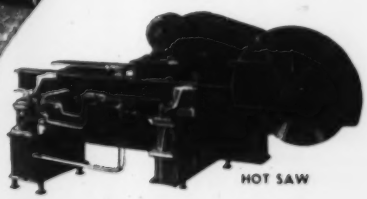
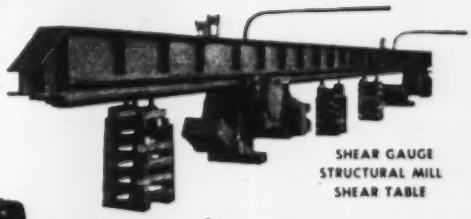
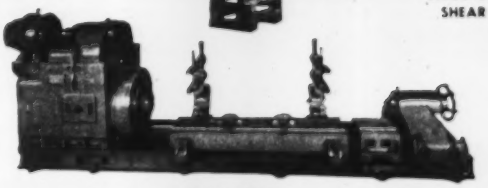
- STRIP AND SHEET OILING EQUIPMENT
- SHEET SCRUBBER AND CLEANING LINES
- HOT SAWS—ROCKING AND SLIDE TYPES
- HOT BEDS—COOLING BEDS—TRANSFERS
- BILLET EJECTORS—PINCH ROLL STANDS
- SLITTERS—SPECIAL SHEARS AND GAUGES
- TILTING TABLES—TRAVELING AND LIFTING TABLES
- CONTINUOUS PICKLING LINES—ROLLER LEVELLERS
- FURNACE CHARGING EQUIPMENT—FURNACE PUSHERS
- STRIP STEEL COILERS AND REELS—SCRAP BALLERS
- RAILROAD SPIKE FORMING MACHINES—ROLL LATHES
- SHEET GALVANIZING LINES—WIRE PATENTING FRAMES
- STRETCHER LEVELLERS—ANGLE AND SHAPE STRAIGHTENERS
- ROLLING MILL TABLES—GEAR AND INDIVIDUAL MOTOR TYPES
- DUCTILE CASTINGS (80,000 PSI)
- MACHINERY BUILT TO CUSTOMER'S DESIGN AND DETAIL DRAWINGS



HOT SAW



SHEAR GAUGE STRUCTURAL MILL SHEAR TABLE



42" ROLL LATHE

The Youngstown Foundry & Machine Co.

OVER SIXTY YEARS OF SERVICE TO THE STEEL INDUSTRY

Youngstown, Ohio

"PACKAGED"

FORGING HAMMER

NAZEL
ELECTRO-PNEUMATIC
SELF-CONTAINED

Write for the NAZEL HAMMER BOOK—you will then understand why there are more Nazels used than any other similar type of Hammer . . . No obligation—write us now.

Yes, "PACKAGED"—because it's an entirely SELF-CONTAINED UNIT, i.e., Hammer, Air Compressor and Electric Motor are "all one"—therefore, the NAZEL requires no overhead piping, boiler, fuel, ash disposal system, separate air compressors, storage tanks, shafting, idlers or pulleys, etc. The Nazel Hammer can be started or stopped at the mere throw of a switch, and it uses power *only when working* (think what this means in comparison with other types of hammers).

Low upkeep cost and *high efficiency* are other features of the Nazel.

To meet Industry's varied Forging Requirements—we produce the NAZEL HAMMER in 5 different types and 18 sizes.

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WILMINGTON 99, DELAWARE
A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

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MAXIMUM SHOCK RESISTANCE

MOST ECONOMICAL UNIT COSTS

HOLD CLOSE TOLERANCES LONGER

LONGER RUNS WITHOUT RESHARPENING

MEET N.P.A. REQUIREMENTS

LARGE QUANTITY PRODUCTION PER TOOL

BETTER RESISTANCE TO WEAR AT HIGH TEMPERATURE

MAXIMUM HARDNESS

GREATER RESISTANCE TO ABRASION

THE *RIGHT GRADE* OF . . .

Firth Sterling "MOLY" HIGH SPEED STEEL

can handle many jobs

BETTER . . . FASTER . . . CHEAPER

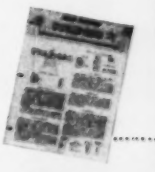
There is a Firth Sterling high speed steel for every purpose . . . whether high speed cutting, holding close tolerances, machining abrasive material, general shop work, or specialized application.

The *right* steel will increase production, reduce down-time and save many times the actual cost of the steel.

Choose the RIGHT STEEL

SEND FOR THESE HELPFUL BULLETINS

CIRCLE M	An 8% cobalt moly steel possessing great cutting capacity, unusual RED-HARDNESS value, and toughness.	For complete information on Circle M, ask for Bulletin SL-2032.
NEW VAN CHIP	Its higher vanadium and carbon content combine to produce superior WEAR-RESISTANCE . . . ideal for cutting hard materials . . . and for holding close tolerances.	For complete information on Van-Chip, ask for Bulletin SL-2033.
STAR-MO	A moly-tungsten steel recommended for GENERAL MACHINING operations.	For complete information on Star-Mo, ask for Bulletin SL-2015.
HI-MO	A made-to-order steel for SPECIAL PURPOSE applications.	Complete information about Hi-Mo will be furnished upon request.



Firth Sterling

OFFICES and WAREHOUSES:
Hartford New York* Philadelphia* Pittsburgh* Birmingham* Dayton* Cleveland Detroit Chicago Los Angeles

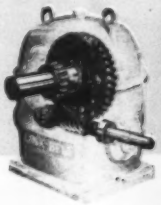
R-256

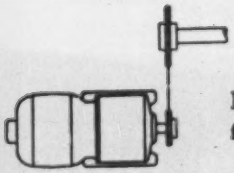
Which of these speed reduction jobs is yours?

High-ratio reduction with right-angle takeoff?

Get a LINK-BELT Worm Gear Drive

Reduction ratios: 3.1:1 to 8000:1. Torque: 1400 to 125,000 in. lbs. Output shaft rpm: 0.22 to 564. Drawing shows motorized P.I.V. variable speed and worm gear drives direct-coupled.

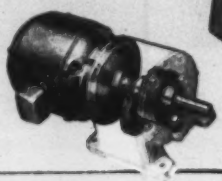




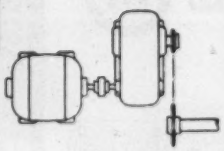
Restricted space for mounting?

Get a LINK-BELT Gearmotor

Reduction ratios: 6.2:1 to 292:1. Hp range: 1 to 50. Output shaft rpm: 6 to 280. Drawing shows gearmotor with roller chain drive.

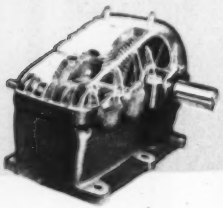


High hp with parallel shaft takeoff?



Get a LINK-BELT Herringbone Gear Drive

Reduction ratios: 2.84:1 to 318:1. Hp range: ½ to 1000. Output shaft rpm: 2 to 600. Drawing shows motor with herringbone gear and roller chain drives.



Yes, LINK-BELT builds all 3

NO LONGER need speed reduction be the limiting factor in a design or application problem. Because no *one* speed reducer solves every reduction problem, Link-Belt builds all three—Helical, Herringbone and Worm. Now it is only necessary to choose the right type of Link-Belt enclosed gear drive . . . and select the hp and reduction ratio that fit your requirements. You can get complete engineering information from the Link-Belt office near you.

LINK-BELT

ENCLOSED GEAR DRIVES

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Offices, Factory Branch Stores and Distributors in Principal Cities.

How would you like to see your costs going down?

(FOR A CHANGE)

● With spiraling costs the headaches they are today, it's especially encouraging to see examples of costs going down. And that's exactly what happened at Walter Kidde & Company, Inc. of Belleville, N. J. This manufacturer put the skids under constantly rising costs by installing six new Warner & Swasey 1-AC Single Spindle Automatic Chucking Machines.

These new machines now handle turning and chucking operations on nine different parts—all formerly done with hand-operated machines—at less than ⅓ of the previous cost.

But that's not all! The 1-AC's helped solve a pressing manpower problem, because one operator can now handle two or more machines.

Result? The Kidde Company now has eight new machines on order with Warner & Swasey—which will give them a total of fourteen 1-AC's!

Warner & Swasey 1-AC Single Spindle Automatic Chucking Machines in use at Walter Kidde & Company, Inc., a leading manufacturer of fire extinguishing apparatus, textile machinery, aircraft and marine equipment.

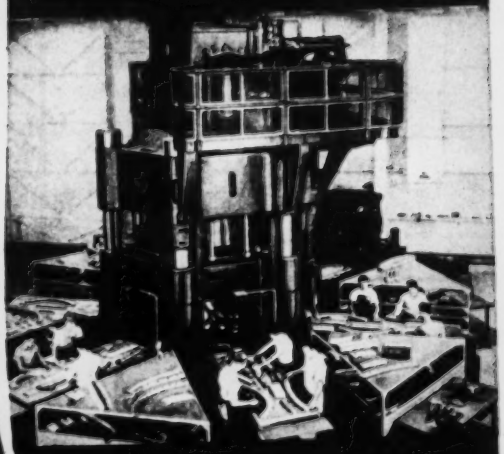
WARNER & SWASEY
Cleveland

YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS, AND TAPPING MACHINES

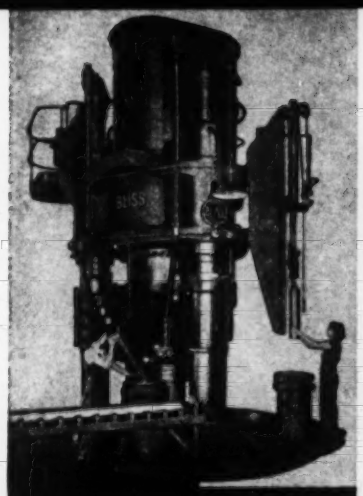
Hydraulic

DRAWING

REDRAWING

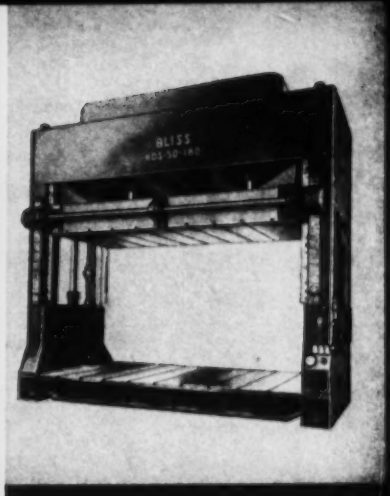


RUBBER PAD FORMING

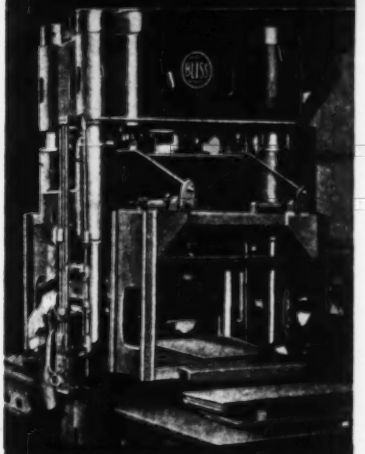


HEADING

COINING



DIE SPOTTING



STRAIGHTENING

Certain fundamental advantages of hydraulic presses make them ideal for many defense and civilian production jobs. That's why Bliss has developed one of the most complete hydraulic press lines available. Whether you're working with sheet, plate or powder . . . whether your needs involve single, double or triple actions, housing or open-rod frames, moving-up or moving-down types, Bliss has a hydraulic press for every operation.

E. W. BLISS COMPANY, CANTON, OHIO

E. W. Bliss (England) Ltd., Derby, England

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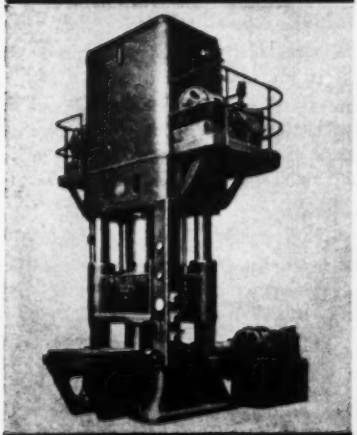
Presses, Rolling Mills, Special Machinery

For the right press for a given job... Hydraulic or Mechanical...

It's Bliss



HOT FORGING

POWDER METAL FORMING

700-Page Handbook Tells How to Use Presses Efficiently

Bliss Power Press Handbook, 450 illustrations. Sections on: Easy methods of computing press jobs • How to select proper press • Engineering tables • Die illustrations • Glossary of terms • Plus service section on all Bliss presses.

Price $7.50

E. W. BLISS COMPANY
Handbook Dept.
Canton, O.

new CLEVELAND turns out 330 seats per hour

for American Seating Co.

Photograph, courtesy American Seating Co.

At the Grand Rapids plant of American Seating Co. the Cleveland Double Crank Press shown here forms 330 folding chair seats per hour. Three progressive dies perform the trim, first and finish curl.

"The performance of our new 80-D-300 ton Cleveland has been completely satisfactory," states Mr. C. M. Highstrete, Plant Engineer. 'Our Cleveland presses have given us excellent performance. Their sturdy construction has kept maintenance to a minimum. We have noticed no deflection under load and have experienced good and satisfactory die-life. Our new Cleveland Drum Type Clutch gives us positive control—has needed no major adjustment in over a year of operation."

Based on experience, American Seating Co. recently ordered more Clevelands.

Before you order your next press, study the advantages incorporated in every one of Cleveland's complete line of presses. Learn of the savings you can obtain with the new Cleveland Drum Type Friction Clutch and Brake.

THE CLEVELAND PUNCH & SHEAR WORKS CO. USA

Established 1880

PUNCHING TOOLS & DIES

FABRICATING TOOLS

POWER PRESSES

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Sea water cure for lagging steel production

A PLAGUE of steel furnace production is down-time for bottom repairs. Good medicine for excessive repairs is Permanente 165 *periclase* ramming mix—derived from sea water magnesia of highest purity.

One of the most important developments in furnace construction in the last decade, Permanente 165 has an MgO content of more than 95% after burn-in. And Permanente 165 bottoms *retain higher strength* during prolonged use.

Accurately sized, pre-shrunk periclase grains give high density. *Full depth bond* is assured because patented Permanente 165 bonds itself by means of crystal-bridging.

This high refractoriness, plus great resistance to chemical attack, means less down-time for repairs between heats, increased tonnage per year. Breakthrough danger is reduced to a minimum!

YOUR Kaiser refractory engineer will give prompt attention to your refractory problem—will offer, where desired, research, design and installation service to give you maximum production most economically. Write for descriptive literature on Permanente 165 and on the companion ramming mix, Permanente 84. Principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California. First National Tower, Akron, Ohio.

Kaiser Chemicals

Pioneers in Modern Basic Refractories

Basic Refractory Brick and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

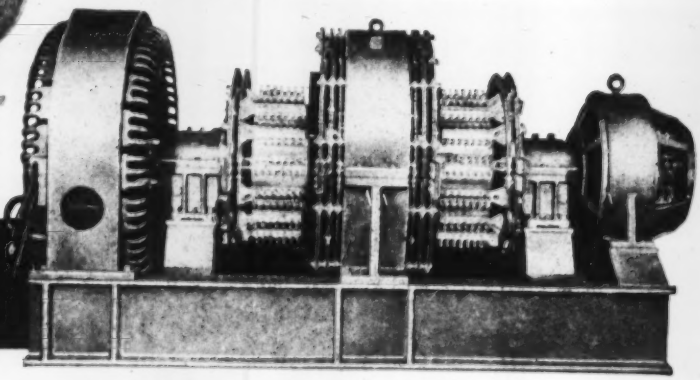
PLATEMANSHIP

H-VW-M's unique combination of:

. . . the most modern and complete laboratory for testing and development

. . . ability to provide complete equipment and materials for every plating and polishing need

. . . the complete background of knowledge and experience in every aspect of plating and polishing.



Only H-VW-M PLATEMANSHIP

brings you so many advantages in low-voltage generators

. . . Brush holders are one piece bronze castings, completely insulated from the electrical circuit; end supported from the bearing pedestal for easy inspection of brushes and commutator

. . . Special copper graphite brushes insure long life and high conductivity

. . . Moulded-in "Equaload" shunts reduce resistance, eliminate selective action, equalize current distribution

. . . Commutator and field coils are properly ventilated by fan action of commutator risers

. . . Rolled steel ring in frame reduces vibration

. . . Long, trouble-free life is assured by oversize sleeve-type bearings

These are the reasons why H-VW-M low-voltage Generators are widely used for electroplating, anodizing, electrotyping, producing electrolytic chemicals and metal refining. They are available in a complete range from 200 to 25,000 amperes and in standard voltage ratings of from 6 through 60. For special applications H-VW-M can design and build motor generator sets to meet any low-voltage requirement and condition.

Each H-VW-M Generator embodies all the refinements developed through three-quarters of a century of building generators for the plating and polishing industry. They fully reflect H-VW-M *Platemanship*—the ability to meet and even anticipate every need of industry in every phase of pickling, polishing, buffing, cleaning, anodizing and plating.

For full details ask for Bulletin G-102.

HANSON-VAN WINKLE-MUNNING COMPANY, MATAWAN, NEW JERSEY

PLANTS AT MATAWAN, N. J. • ANDERSON, INDIANA • SALES OFFICES ANDERSON • CHICAGO • CLEVELAND DAYTON • DETROIT • GRAND RAPIDS • MATAWAN • MILWAUKEE • NEW HAVEN • NEW YORK PHILADELPHIA • PITTSBURGH • ROCHESTER • SPRINGFIELD (MASS.) • STRATFORD (CONN.) • UTICA

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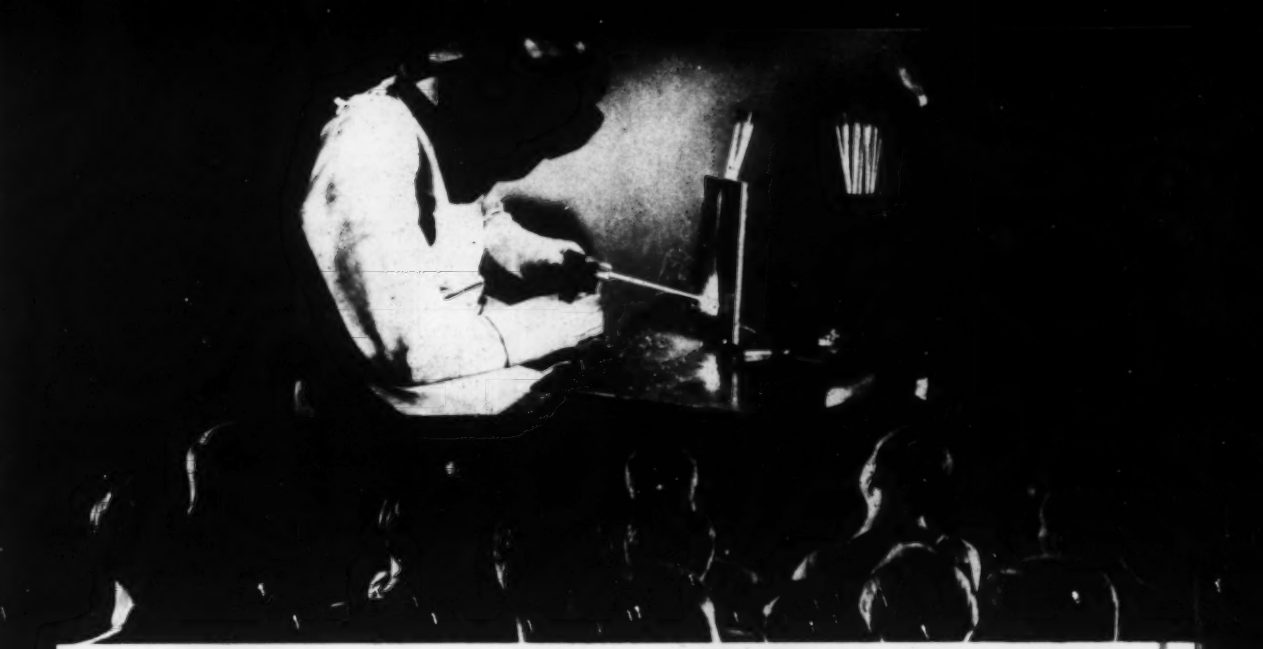
INDUSTRY'S WORKSHOP FOR THE FINEST IN PLATING AND POLISHING PROCESSES • EQUIPMENT • SUPPLIES



Train Your Operators Better and Faster with G-E's Movie "The Inside of Arc Welding"

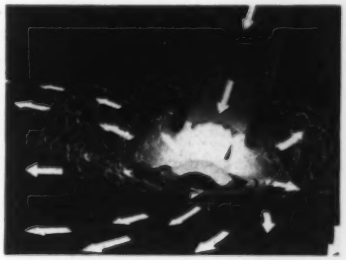
Full Color and Sound Movie Speeds Training Programs up to 20%

Teach beginners the fundamentals of arc welding quickly with the color movie, "The Inside of Arc Welding." Produced during World War II, this movie speeded up training of operators as much as 20 percent. The film enables instructors to give even the largest classes many of the advantages of individual attention.

Authentic photographs and animated cartoons show all details of the arc-welding process: current setting, angle of electrode, length of arc, electrode travel speed. You can see good and bad welds in cross section, and watch experienced operators demonstrate principles of arc welding in *all* welding positions.

In Six Parts—each part 10 minutes and complete in itself (16mm color and sound)

1. *Fundamentals*
2. *Flat position*
3. *Horizontal position*
4. *Flat and horizontal with AC*
5. *Vertical position*
6. *Overhead position*



Animated drawings illustrate the arc and molten pool in terms easy for the beginner to understand

You Can Buy These Films at Cost for your Training Programs. "The Inside of Arc Welding" costs only $55 per part, or $330 for a complete set of six parts. "The Story of AC Welding" costs $95 for Part I and $105 for Part II. Write to Section 712-14, General Electric Company, Schenectady 5, N. Y.

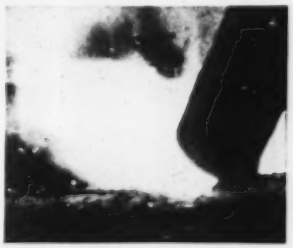
You Can Borrow Prints, free of charge, for single showings. Just get in touch with your authorized G-E Welding Distributor. You can find his name by looking for General Electric under "Welding Equipment" in the yellow pages of your telephone directory.

"THE STORY OF AC WELDING"

Shows You Why AC Is Best for Three out of Four Welding Jobs!

"The Story of AC Welding" explains how you can improve weld quality, increase welding speeds and reduce costs with AC welders.

You see clearly, by means of actual photographs and animated cartoons, why and how AC eliminates troublesome arc blow. You see the arc's action in corners, angles and intersections. The arc and molten pool are shown in close-ups. Part I shows actual operation of the arc while Part II shows advantages of AC. Each part is in full color and sound.



The film shows the causes and effects of troublesome arc blow, and how AC eliminates it.

GENERAL ELECTRIC

712-14

we never use crystal gazers.....

in the making of

WICKWIRE WIRE.....

Crystal gazers have no place in the making of Wickwire Wire. Our engineers and metallurgists work with the specialized know-how of long experience... maintain constant and careful control over every phase of production starting with the analysis and composition of iron in our blast furnaces and steel in our open hearth furnaces.

Rigid testing, checking and inspection — every step of the way — are your assurance that when you specify Wickwire Wire you can always count on unvarying uniformity of quality, size, tensile strength and stiffness.

We would welcome an opportunity to apply our skill and experience to the solving of any wire problem you may have. High or low carbon steel; round or shaped; in all tempers, finishes and grades — FOR THE WIRE YOU REQUIRE... CHECK FIRST WITH WICKWIRE.

For additional information write or phone our nearest sales office.

THE COLORADO FUEL & IRON CORPORATION – Denver, Colorado
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WICKWIRE SPENCER STEEL DIVISION – Atlanta • Boston • Buffalo
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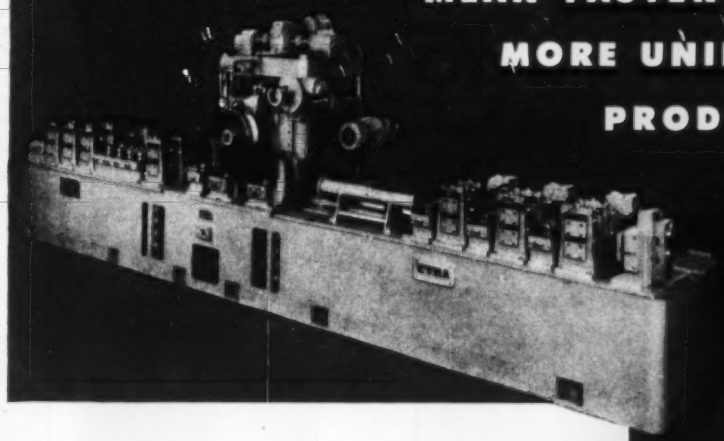
WICKWIRE WIRE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL & IRON CORPORATION

TUBING COSTS TOO HIGH?

ETNA TUBE MILLS MEAN FASTER... MORE UNIFORM... PRODUCTION!



CHECK THESE FEATURES!

UNIVERSAL TYPE DRIVE
INTEGRAL BASE
PERMANENT WELDING TRANSFORMER
EASE OF SET UP
COMPLETE AND EFFICIENT COOLING
CONCENTRATED CONTROL
QUICK ROLL CHANGE
EFFICIENT LUBRICATION
ADAPTABILITY TO ROLL METHODS
INDEPENDENT UNITS
DRIVE INTEGRAL WITH MACHINE
HEAVY CONSTRUCTION
EASE OF MAINTENANCE

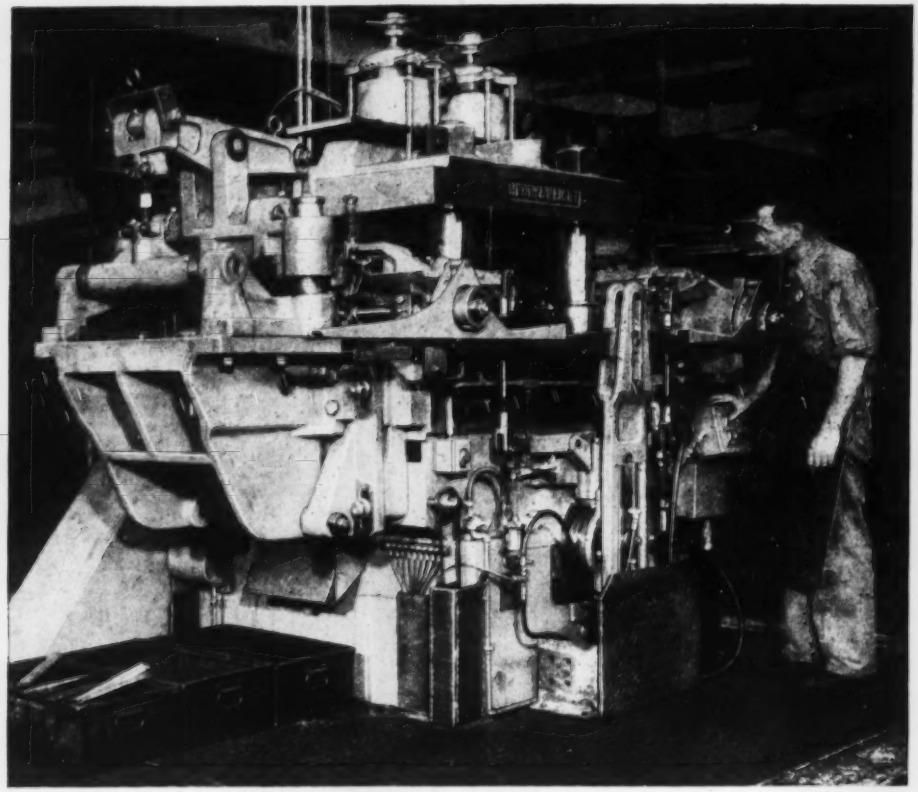
Etna Resistance-Weld Tube Mills utilize universal type drive. Components are bolted and keyed at the bases, forming an integral unit that maintains perfect alignment, giving greater production of tubing that is *uniform in size*. All parts of Etna Mills are built in complete units, so that different arrangements can be made to meet the requirements of the job. Increase the rate of production . . . the quality of *your* tubing . . . Write Etna regarding your specific job problems.

MANUFACTURERS OF BETTER TUBE MILLS...
BETTER SWAGING MACHINES...
FOR MORE THAN HALF A CENTURY

THE ETNA MACHINE CO.

3400 MAPLEWOOD AVE. TOLEDO 10, OHIO

H & W Dieing Machines



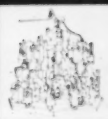
New, Bigger Dieing Machine is producing 4500 pieces per hour for Hart & Cooley Mfg. Co. This new 200-ton machine features basic Henry & Wright design principles:

- Flywheel, crankshaft and connection are below the punchholder instead of above.
- Low center of gravity for high speed with minimum vibration.
- Punch is pulled, not pushed.
- Maximum guiding surface — four post guide for punchholder.
- Upper crosshead takes only the pressure necessary to perform work in die — no crankshaft thrust.

OTHER EMHART PRODUCTS INCLUDE:

PREMIUM QUALITY STAMPING PRESSES

THE V & O PRESS CO.
Division of Emhart Mfg. Co.
HUDSON, NEW YORK



GLASS MAKING MACHINES

HARTFORD-EMPIRE CO.
Division of Emhart Mfg. Co.
HARTFORD 2, CONNECTICUT

AUTOMATIC PACKAGING EQUIPMENT

STANDARD-KNAPP
Division of Emhart Mfg. Co.
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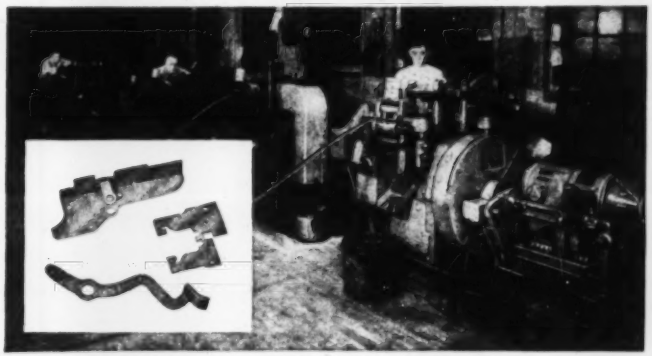
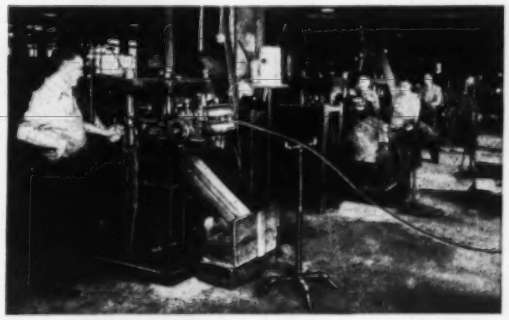
PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES

PLAX CORPORATION
Subsidiary of Emhart Mfg. Co.
HARTFORD 1, CONNECTICUT

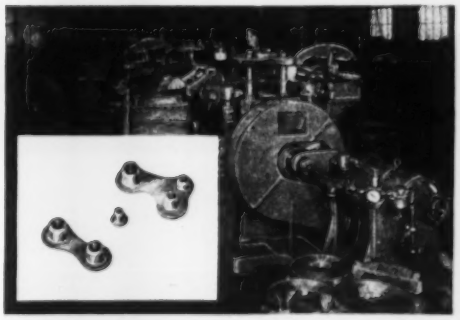
many more pieces at much less cost



Runs of 3,000 to 100,000 are produced on Henry & Wright Dieing Machines at Underwood. About 200 different typewriter parts are made on them, ranging from simple piercing and blanking to stampings produced in multiple station dies including piercing, lancing, extruding, shaving, forming and blanking with each stroke of the machine.



Thousands of Different Parts are produced on Henry & Wright Dieing Machines at the P. & F. Corbin Division of American Hardware Corporation. Variable speed drive on the H & W machines permits Corbin to select stroke rate best suited to the various types of parts.



Waterbury Brass Goods Branch, American Brass Company, Waterbury, Conn., has a group of Henry & Wright Dieing Machines for formed metal parts where the quantities involved average one million pieces or more per item. Economical production costs are consistently obtained. Small parts are manufactured five at a time passing through as many as 14 die stations.

Only the best is good enough

FACT PACKED CATALOG

Complete descriptions of all Henry & Wright Dieing Machines. Write: Henry & Wright, 441 Windsor St., Hartford 5, Conn.

HENRY & WRIGHT
Division of Emhart Mfg. Co.

by FARRELL-CHEEK

ECONOMICAL, LONG-WEARING STANDARD OR SPECIAL

ALLOY CAST STEEL PARTS

FARRELL-CHEEK is a name which has grown to be accepted as standing for the finest in cast steels. The excellent physical properties which have been developed during more than forty years of research and experimentation provide industrial parts which are tough and durable, and eminently resistant to wear.

Farrell-Cheek special steels, Carbon, Farrell's 85, and Farrell's Hard Edge possess the particular qualities which enable parts to serve best under specific working conditions. Farrell's 85 is made in combinations of carbon, vanadium, nickel, copper, or chrome, with manganese-molybdenum. It can be heat-treated in its entirety to combine toughness, rigidity, and resistance to wear. Farrell's Hard Edge can be hardened to depths of from ⅛" to ¼", and so permit fine machining qualities along with high resistance to abrasive wear.

The experience which Farrell-Cheek has had in the successful production of small to medium castings makes it a truly one-point source for your needs for new and replacement parts. A completely modern plant, constant, thorough controls supervised by competent engineers, plus skilled manufacturing methods, will furnish the service you desire.

FARRELL - CHEEK STEEL CO.

MANUFACTURERS OF HIGHEST QUALITY ELECTRIC FURNACE CARBON AND ALLOY STEEL CASTINGS

FARRELL'S CARBON STEEL CASTINGS
FARRELL'S HARD EDGE STEEL CASTINGS
FARRELL'S "85" STEEL CASTINGS

RAILROAD CASTINGS
Locomotive and Car, R. R. Specialty Castings
ELEVATOR, CONVEYOR PARTS
Sprockets, Traction Wheels, Chains, Buckets, Rollers, Idlers

BUSHINGS
Carbon and Alloy Steels, Machined, Hardened, Ground
CRANE WHEELS
Overhead, Gantry, Monorail, Ingot Car, Charging Machine

GEARS AND PINIONS
"True Tooth" Gears and Pinions, Shearers and Wheels
SPECIALIZED CASTINGS
Light Section Castings

STOKER PARTS
Feed Screws, Furnace Tools, Flanged Pipe, etc.
HEAVY HARDWARE
Wire Rope Fittings, Choker Hooks, Bar Benders, Cutters

YOUR INQUIRY WILL PROMPTLY BRING DETAILED INFORMATION PERTAINING TO ANY OF THE ABOVE FARRELL-CHEEK PRODUCTS

SANDUSKY, OHIO U.S.A.

BULLARD

MANUFACTURERS OF MACHINE TOOLS

Boulder Dam, Arizona from the Nevada Side — Kaufman & Fabry Photo

The Invisible Background of Industrial Progress

Boulder Dam or, as some people know it, "Hoover Dam" was authorized by Congress December 21, 1928, and completed in 1936. It is the world's highest dam, creating Lake Mead, the world's largest artificial lake. It provides for river regulation, flood control, irrigation and power.

The capacity of its generating plant is rated at 1,034,800 kilowatts, supplying about half of the power required in Southern California. . . Free government, free enterprise and American ingenuity conceived and completed this gigantic project adding immeasurably to our general economy through benefits to the American people. . .

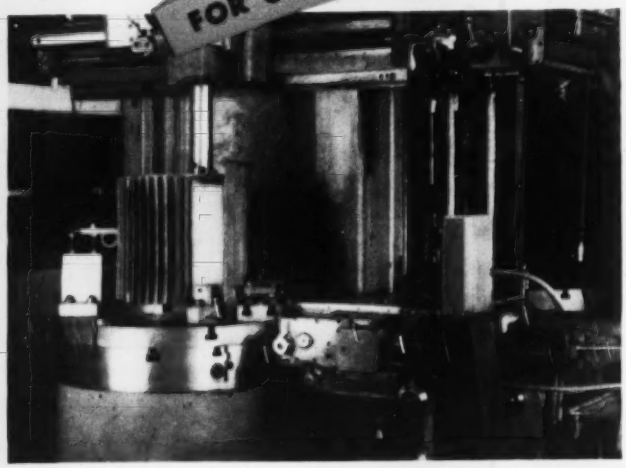
★*Modern Machine Tools* played an important part in the manufacture of construction machinery and equipment used in building Boulder Dam as well as many of the component units in its operating and maintenance facilities. Yes, Machine Tools are an important factor in manufacturing parts for generating plants, other transmission equipment and the entire electrical industry. . . New industrial and agricultural developments in our great Southwest are directly attributed to such projects as Boulder Dam and indirectly to Machine Tools in the Invisible Background.

THE BULLARD COMPANY
BRIDGEPORT 2
CONNECTICUT

★ For greater manufacturing economy
REFER to next page

BULLARD MACHINE TOOLS

FOR GREATER MANUFACTURING ECONOMY



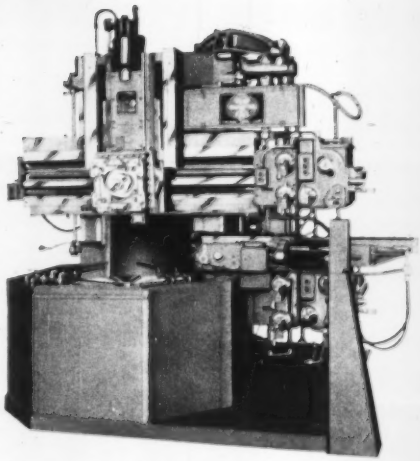
The inception of Bullard Man-Au-Trol Vertical Turret Lathes began a New Era of metal cutting in the field of single spindle turret lathes.

Man-Au-Trol principal provides both manual or automatic control of the machine and a simple method of predetermined operations easily reset for changes in work design.

Versatility and many modern features of Man-Au-Trol Vertical Turret Lathes place them at the top of the list for Greater Manufacturing Economy.

Machining an electric motor frame as illustrated above is only one of the many classes of work that Man-Au-Trol produces for the Greater Economic World in which we live.

The present urgency for delivery of electrical units needed to power all types of Industries, road building, agricultural, transportation and many, many other kinds of equipment are calling upon Bullard for delivery of Machine Tools to speed the manufacturing processes.



Learn more about Man-Au-Trol Vertical Turret Lathes built in 30-, 36-, 42-, 54-, 64-, and 74-inch sizes. Write for circular.

BULLARD

THE BULLARD COMPANY

BRIDGEPORT 2, CONNECTICUT

FLAT SPRING STEEL

You can get it now! . . . and we believe it's the best spring steel we've ever made

OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

This new spring steel is tops in uniformity. It saves you preparation time . . . cuts down machine stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

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Wherever steel is rolled
you'll find **NATIONAL ROLLS**

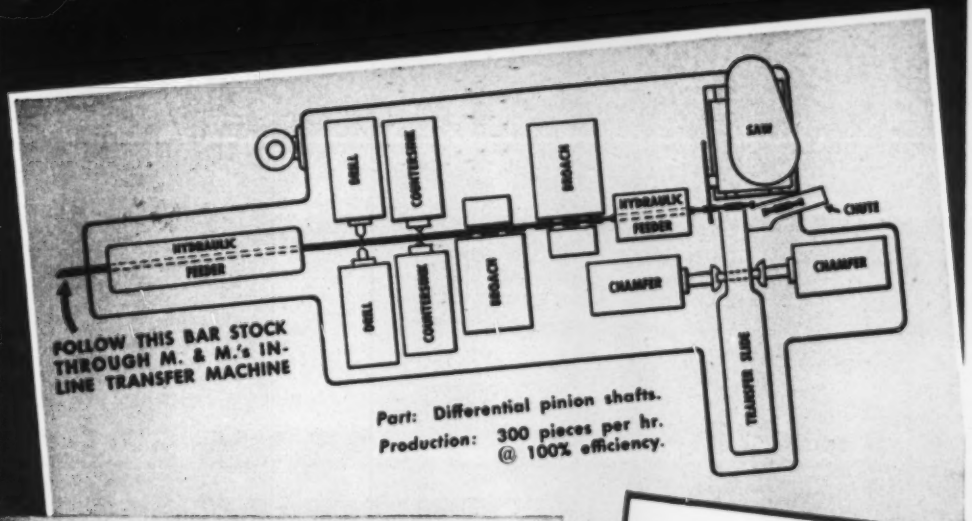
Not only in this country but in the leading rolling mills in South America, Canada, Western Europe, National Rolls are well-known for their dependable performance and long tonnage life.

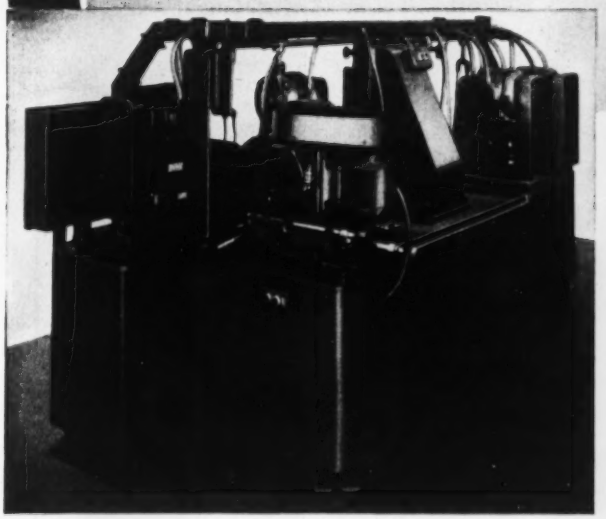
This reputation, built up over the forty-three years that National has been making rolls, is maintained by National's skilled metallurgical staff which maintains close supervision over quality control in every phase of production of National Rolls.

SPECIALISTS IN IRON AND ALLOY IRON ROLLS AND CASTINGS

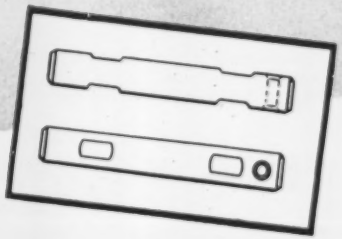
THE NATIONAL ROLL & FOUNDRY CO.
Avonmore, Pennsylvania

Combine Operations





Save time and floor space by combining operations.



● Many machining operations are combined on an M. & M. progressive IN-LINE automatic transfer machine. Stock is held *motionless*. Most of the operations are performed on a length of solid bar stock prior to cutting off. Using the progressive in-line principle, we can design a production machine for your individual requirements. Odd-shaped extrusions present no machining problem.

Send us your parts drawings.

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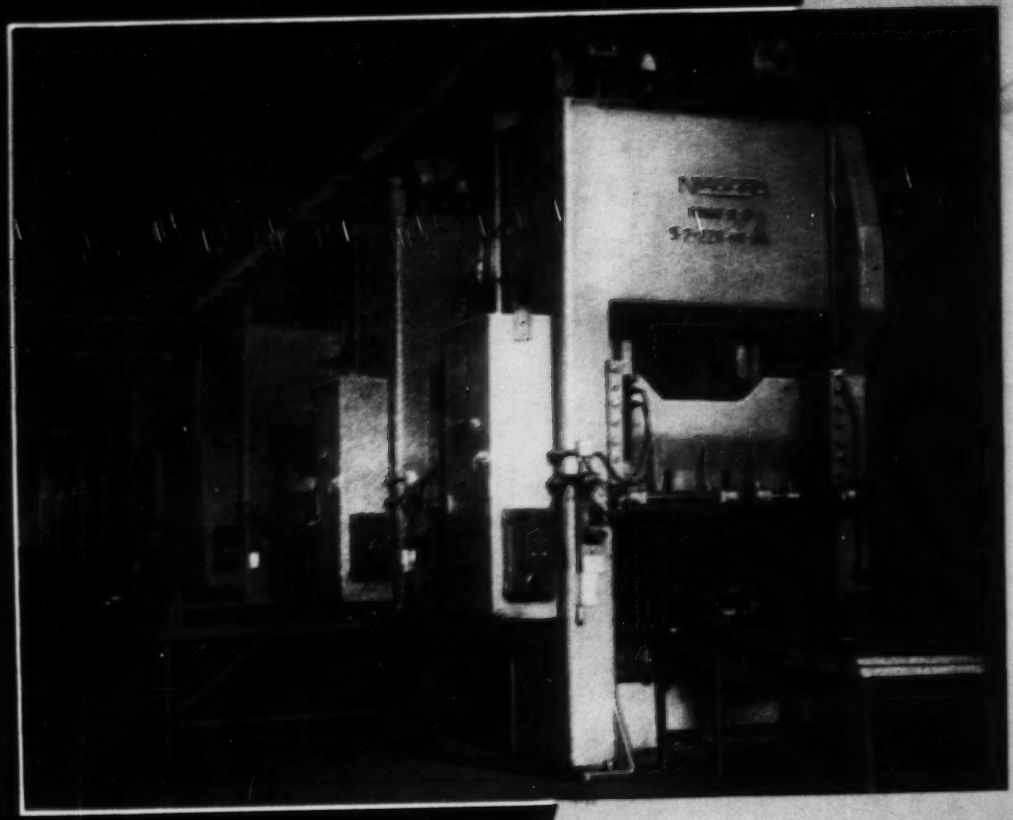
THE MOTCH & MERRYWEATHER MACHINERY COMPANY

715 PENTON BUILDING • CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines

PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT

NIAGARA



NIAGARA MACHINE & TOOL WORKS · BUFFALO 11, N. Y.

straight side double crank

PRESSES

Speeding up Defense Production in Large Automotive Plants

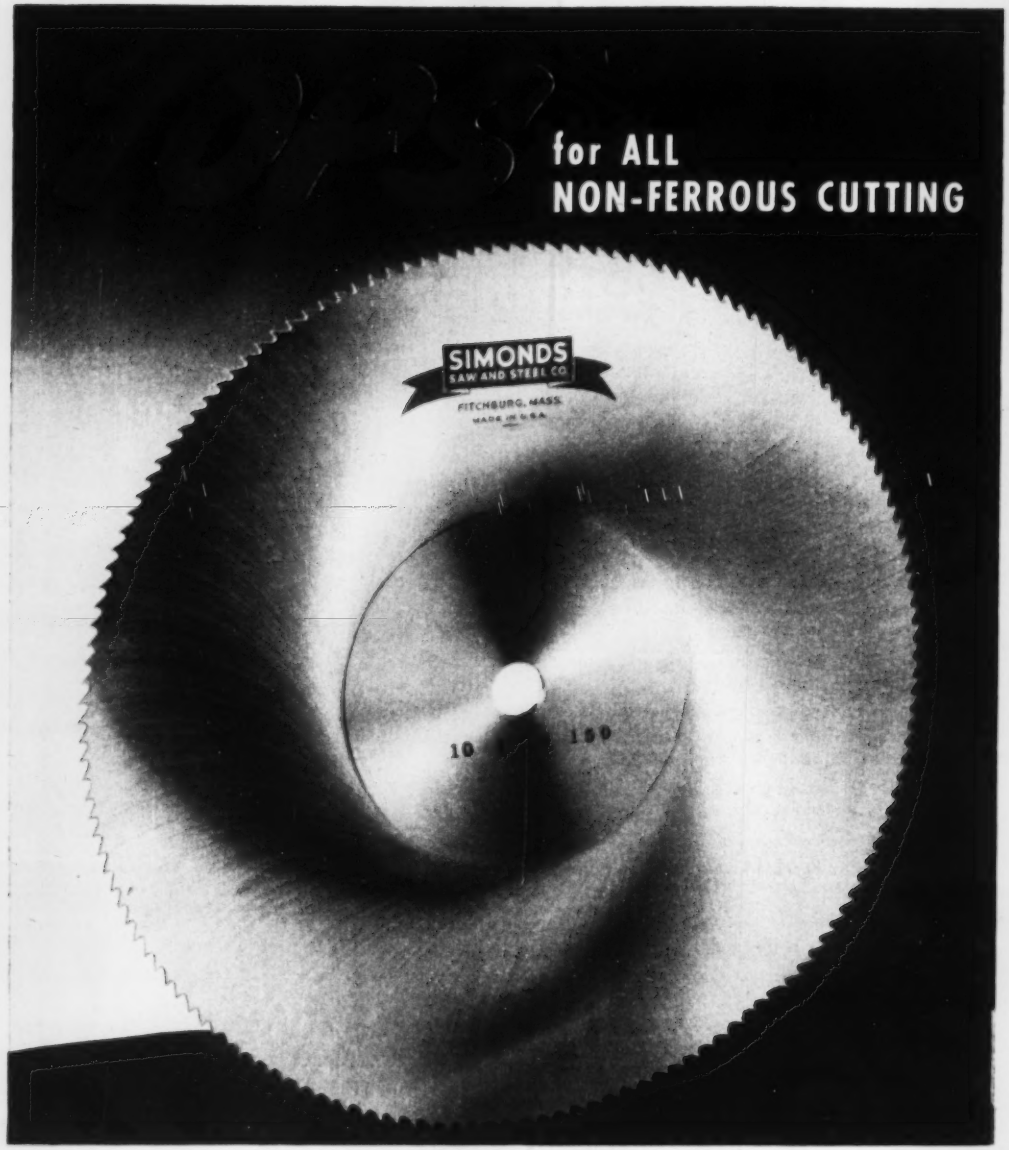
Niagara advanced engineering features and modern streamline styling combine to make these presses leaders in their field.

- **Electrically welded steel construction**
- **Air actuated electrically controlled sleeve and friction clutches**
- **Anti-friction bearing mounting for high speed shafts, flywheel and clutch wheels**
- **Gearing enclosed and running in oil**
- **Neither gearing nor shafting overhang the working area to block light and be a potential danger**
- **Single and double geared**
- **Single or double end (twin) drive**
- **Adjustable air counterbalance for slide**
- **Pneumatic draw cushions with adjustable pressure and surge tank**
- **Wide range of sizes and capacities**
- **J. I. C. features if desired**

Write for catalog

Manufacturers of a complete line of sheet metal working equipment ranging from small hand tools up to large power operated machinery.

DISTRICT OFFICES: DETROIT • CLEVELAND • NEW YORK


for ALL
NON-FERROUS CUTTING

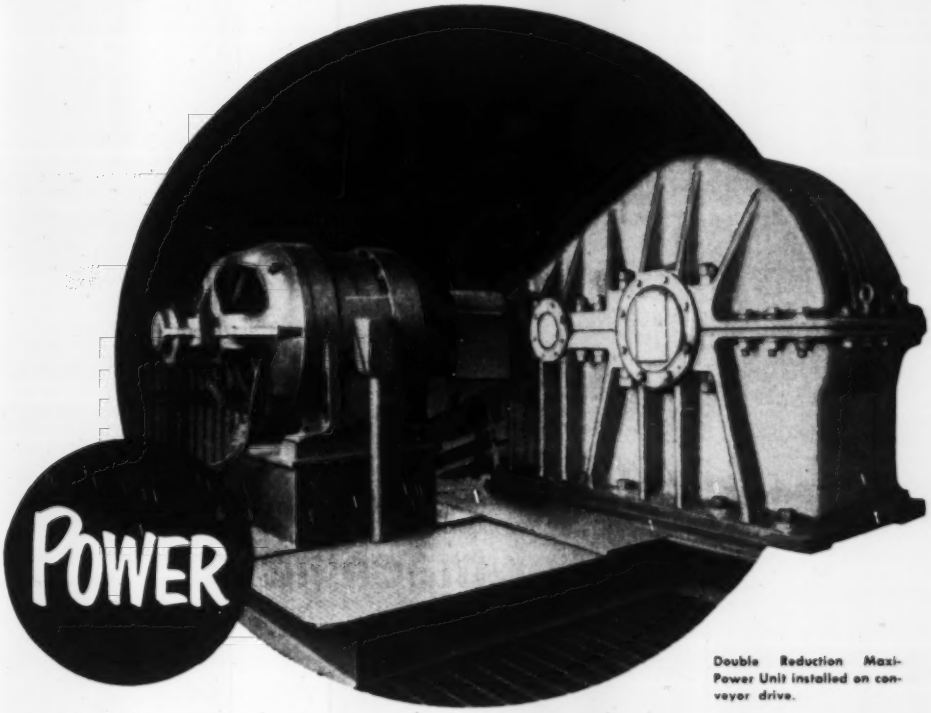
On all non-ferrous metals, here's the toughest, most "stand-up-and-take-it" saw made . . . with a proven production record on everything from light-wall sections to solids.

SIMONDS heat-treats these saws for individual applications, according to speed, type of material, and machine. And SIMONDS design assures top cutting efficiency . . . with correct tooth-shape that eliminates clogging of gullets . . . with high, smooth finish that resists adherence of chips to plate . . . and with proper clearance for freer, cooler, straighter cutting.

Standard sizes are immediately available from stock . . . so see your Simonds Distributor *today*.

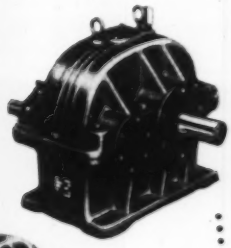
SIMONDS
SAW AND STEEL CO.

Factory Branches in Boston, Chicago, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.

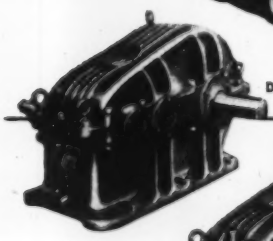


Double Reduction Maxi-Power Unit installed on conveyor drive.

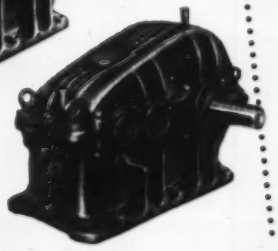
in minimum space with *Maxi-Power* parallel shaft drives



SINGLE REDUCTION



DOUBLE REDUCTION



TRIPLE REDUCTION

For heavy-duty applications, here is a drive that offers the maximum in sturdy, reliable service.

Precision generated helical gearing with uniform load distribution across the entire face means improved performance — permits maximum load-carrying capacity in minimum space.

Maxi-Power Drives are available in single, double and triple reductions in ratios from 2.08 to 1 up to 360 to 1 — capacities up to 1,550 h.p.

Mail the coupon for engineering bulletin on Maxi-Power Drives or call the Foote Bros. Representative near you.

FOOTE BROS. GEAR AND MACHINE CORPORATION
Dept. X, 4545 S. Western Blvd. • Chicago 9, Illinois

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Better Power Transmission Through Better Gears

Foote Bros. Gear and Machine Corporation
Dept. X, 4545 S. Western Blvd., Chicago 9, Ill.

Please send Bulletin MPB containing full information on Maxi-Power Drives.

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That goes for machine tools, too!

Even when machining at high speeds and feeds, Antisep All-Purpose Base solutions remove heat so swiftly that smoke has no chance to get started. Parts come off cool. Cutting tools last longer. Operators are better satisfied.

You can dilute Antisep A. P. Base heavily —as much as 1 part to 30 of water—and use it for general machine work as well as for automatics. Latest case-study booklet gives you scores of examples of Antisep's great cooling ability, safety, finish, and speed. Get a copy of this informative book without cost to you, from E. F. Houghton & Co., Philadelphia 33, Pa.

"NO MORE 'SMOKE SCREEN' ON OUR NUT-TAPPING OPERATIONS"...

A New England tool company reports that switching to Antisep gave them the top-quality finish demanded in their production of Diesel connecting rod nuts ... and much cleaner work. SAE 4140 steel is the metal machined on a Warner & Swasey No. 5. Antisep Base, diluted with water, cost 22c per gallon and replaced former coolant costing over 70c per gallon.

COOLANT COSTS CUT 68%!

RESULT:

another regular Antisep user!

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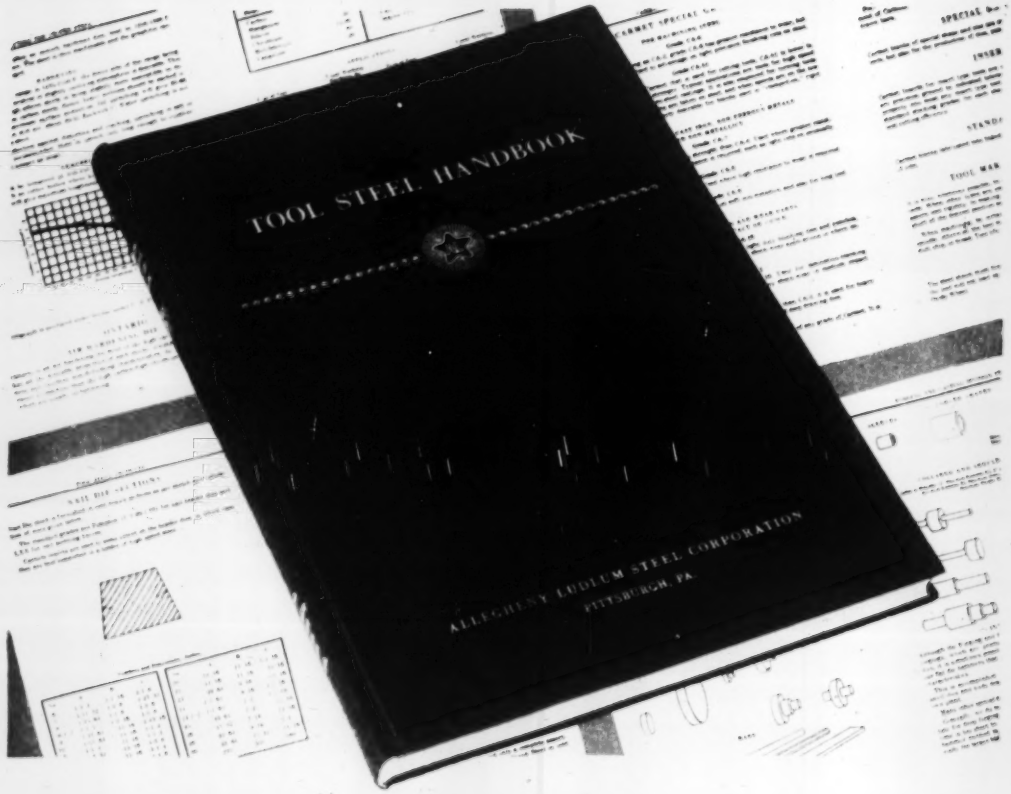
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

So you want to split hairs?

Well, here's a man who can do it for you. His educated touch, on the controls of this massive new 4-high rolling mill, holds Bristol Brass sheet and strip to precisely the specified thickness, *down to tenths of thousandths of an inch.* And this working combination of mill-wise men and modern machinery is what makes every foot of Bristol sheet, rod and wire *uniformly* "Brass at its Best." The Bristol Brass Corporation, since 1850 in Bristol, Conn. Offices or warehouses in Boston, Chicago, Cleveland, Dayton, Detroit, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Providence, Rochester.

"Bristol-Fashion" means Brass at its Best



AVAILABLE NOW—196 pages of Valuable Tool Steel Information

A new Tool Steel Handbook—one of the most comprehensive treatises of its kind ever offered by a tool steel producer—has just been published by Allegheny Ludlum. In addition to a relatively complete picture of Allegheny Ludlum Tool Steels, their properties, applications and the forms in which they are available, this 196-page case-bound book presents an extensive discussion of heat treating and handling techniques as well as a complete set of weight tables and other useful reference material.

Your copy of the Tool Steel Handbook will be sent—*without charge*—upon request. Our only stipulation: please make your request upon your company letterhead. ● Write Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.

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Remember this also
America must have more Scrap to make more Steel!
Get in the Scrap Now!

For complete **MODERN** Tooling, call
Allegheny Ludlum

AL
FINE TOOL STEELS SINCE 1854

The Passkey to TOP BRAZING PRODUCTION to BOTTOM BRAZING COSTS

EASY-FLO

Typical Application of the Easy-Flo Brazing Formula

1. THE ASSEMBLY

A steel tube [illegible] a ring of 3 [illegible] preplaced on [illegible]

2. THE [illegible] METHOD

[illegible] in 2 parallel rows of burners.

3. [illegible]

A [illegible] which travels between the rows of burners. Operator [illegible] parts on jigs on the chain, preplaces the EASY-FLO rings and [illegible]. Vertical pins support and position stamping [illegible]. Each operator loads on jigs and rotates them for uniform heating. Close-up shows construction. Chain [illegible] is timed for proper heating. Finished [illegible] drop off into quenching tank.

RESULTS

225 assemblies per hour, beautifully brazed [illegible] the human element entirely eliminated from the actual brazing.

If you need *more* joints per hour—if you need *better* joints—if you need to *cut costs*—you can open the doors to all three with EASY-FLO—the low-temperature silver brazing alloy.

You simply apply the 3-part EASY-FLO brazing formula—(1) *preplace* the alloy—(2) use a *fast* heating method—(3) devise a set-up that will keep assemblies on the move to and through the heating zone. At left is a typical example.

A BRAZING EXPERT IS AT YOUR CALL

We'll be pleased to send a Field Engineer to your plant to help you apply the EASY-FLO formula to your brazing needs. *There's no cost or obligation*—so, why not get the benefit of this man's wide production brazing experience. Just contact our nearest office or dealer and say when you'd like him to call.

GET THE WHOLE AMAZING EASY-FLO BRAZING STORY IN BULLETIN 20 ... *Learn why strength, speed and low-cost are inherent in EASY-FLO brazing. Write today for a copy of this informative 24-page bulletin.*

See this set-up in action at the ASTE EXPOSITION—Chicago

It's an eye-opening demonstration of simplified production brazing you won't want to miss ... Also examine the many other examples of EASY-FLO brazed parts from defense and domestic production ... And watch the carbide tipping of cutting tools by the fast, economical EASY-FLO brazing process ... Discuss your metal joining problems with our experienced engineers

—BOOTH 1818

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ANOTHER CHAPTER IN
THE HISTORY OF LEPEL

Lepel's NEW HOME

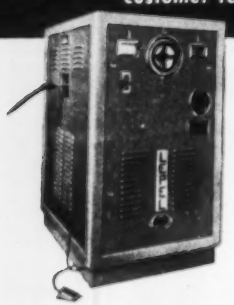
JUST ACROSS THE EAST RIVER IN WOODSIDE, NEW YORK CITY

The new building containing our new factory and offices, designed on the most modern architectural lines, reflects the steady gains made by Lepel for a quarter of a century.

The reputation enjoyed by Lepel in the field of Induction Heating equipment has been made possible by the high quality of the Lepel products and the integrity of the Lepel organization with its pleasant customer relationship.

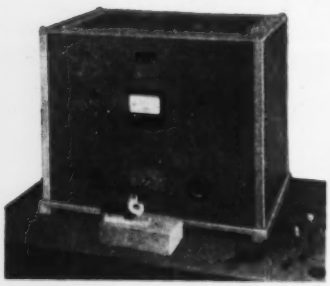
Lepel

HIGH FREQUENCY *Induction* HEATING UNITS



SPARK GAP CONVERTERS
from 4 kw to 30 kw

ELECTRONIC TUBE GENERATORS
from 5 kw to 50 kw



LOW COST 2 KW PORTABLE UNITS
Spark Gap operated on 110 volts

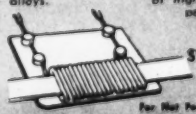
ANY LEPEL UNIT DOES THESE JOBS— *faster better cheaper*

HARDENING
Heat localized exactly where wanted, to any desired temperature up to 5000° F.

BRAZING
Permits widest choice of copper or silver brazing alloys.

MELTING
Readily melts metals and alloys of high melting point.

SOLDERING
Neater, faster, without waste or discoloration.



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For Wire Forging, Wire Drawing, etc.

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WRITE FOR LEPEL CATALOG ST-3

From all over the Middle West . . .

Manufacturers call

CENTRAL STEEL AND WIRE COMPANY

for metallurgical engineering assistance

For years, manufacturers, large and small have looked to Central Steel for help in solving intricate metal working problems.

Questions on machinability, heat treatment, physical properties, tolerances, Government Specifications and material applications are answered daily without obligation.

Regardless of whether you buy material from one of our four strategically located warehouses, if you are having difficulty working any metal, we want you to telephone, write or wire us.

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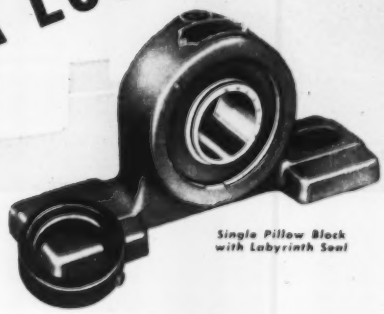
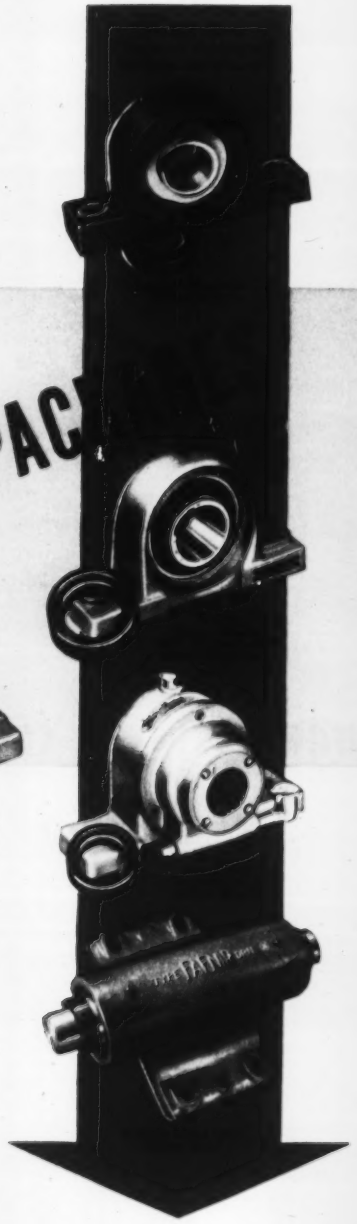
Short Cut to Better Bearing Performance

FAFNIR ECONOMY PAC



Single Pillow Block with Labyrinth Seal



If you are a manufacturer of fans and blowers or any other equipment where bearings are essential, you can often get the advantages of ball bearings without using "specials" that run up your costs. Here's how!

With Fafnir Standard Ball Bearing Units, you cut costs two ways: (1) the cost of the unit as compared with "Specials" and (2) the elimination of complicated machining and special housings. In addition, installation costs are pared way down because these units have the famous Fafnir Wide Inner Ring Ball Bearing with self-locking collar . . . makes adapters, sleeves and lock washers unnecessary. Seals keep lubricant in, dirt out. Now you know why we call these Fafnir units "Economy Packages".

Whatever your product or plant equipment . . . a few minutes spent with a Fafnir representative may bring forth an "Economy Package" that provides a short cut for you to the kind of performance only ball bearings can give.
The Fafnir Bearing Company, New Britain, Conn.

FAFNIR
BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

Let us prove this prophet false

"We shall force the United States to spend itself into destruction."

These are the words of Lenin, father of Russian Communism. Quoted from page 191, volume xxi, of his Collected Works, they were printed recently in a metropolitan newspaper.

This is the announced goal of the Politburo, and it is the direction in which many patriotic citizens fear we are headed. For example, Congress has just appropriated $87 billion to be spent during 1952, and enacted taxes estimated to produce only $71 billion. The deficit is to be added to our national debt, already $259 billion; and this deficit will depreciate the national currency by another $16 billion.

Part of this stupendous appropriation is to rearm ourselves and the free world against Communist attack. But what about the rest of our spending?... Let us also be realistic. It is time for us as a nation to pause, reflect and consider well. We can do three things to avoid national bankruptcy:

1. Eliminate every non-essential federal expense.
2. Provide taxes to pay all obligations as we go.
3. Pay off some of our national debt every year.

Let every citizen who believes in preserving our nation from the economic termites within, as well as from the announced enemy without, become an active worker to prove the Russian prophet false.

YOUR SCRAP IS NEEDED — YOUNGSTOWN

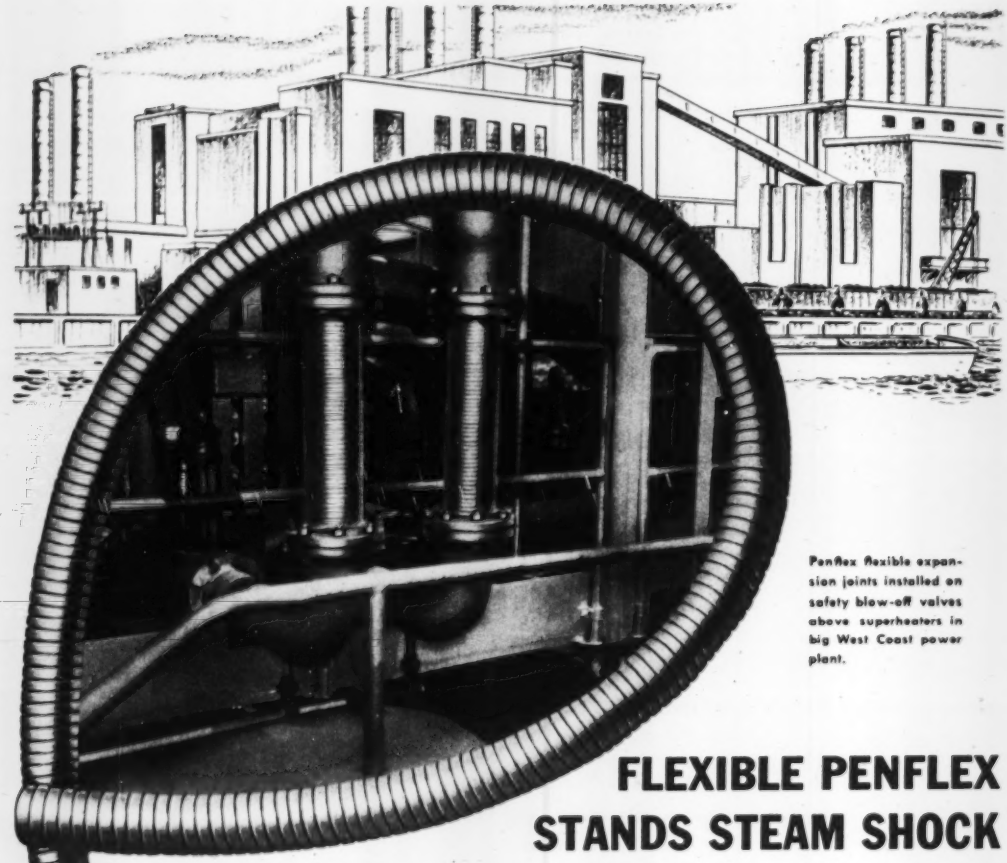
The Youngstown Sheet and Tube Company

General Offices -- Youngstown 1, Ohio

Export Offices -- 500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

The steel industry is using all its resources to produce more steel, but it needs your help and needs it now. Turn in your scrap, through your regular sources, at the earliest possible moment.



Penflex flexible expansion joints installed on safety blow-off valves above superheaters in big West Coast power plant.

FLEXIBLE PENFLEX STANDS STEAM SHOCK

PENFLEX TUBING ABSORBS THERMAL EXPANSION . . . PREVENTS BLOW-OUT

Without warning, the safety valves atop these big superheaters suddenly pop. A mighty surge of 900 F, eight-hundred-and-fifty-pound steam blasts through the pipes to exhaust to atmosphere. These pipes have to know how to take it!

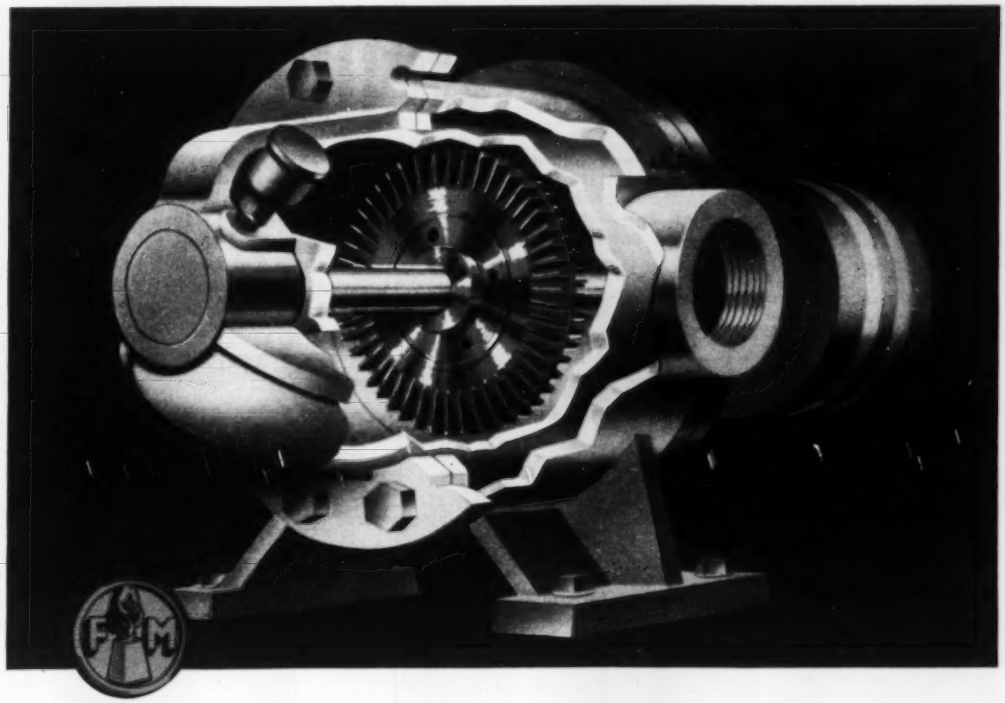
Ordinary rigid pipe would blow apart under the terrific thermal expansion. But Penflex flexible metal tubing has enough "give" to take the shock. Six lengths of 8" Penflex interlocked tubing installed as expansion joints on the boiler blow-off line cushion the sudden impact . . . take up any pipe movement due to extreme temperature and pressure changes.

Penflex engineers can help you solve your tough tubing problems. Penflex makes a complete line of 4-wall interlocked and seamless welded corrugated tubing . . . metallic hose, tubing and couplings from $\frac{1}{8}$" I.D. up . . . automatic barrel fillers, pneumatic rivet passers, accessories and fittings. Write for illustrated folder "Flexineering." It's a valuable production aid.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7219 Powers Lane, Phila. 42, Pa.
Branch Sales Offices: **Boston • New York • Chicago • Houston • Cleveland • Los Angeles**

penflex

HEART OF INDUSTRY'S LIFE LINES



Its heart is its one moving part

With castings in quality as well as in quantity, National Bearing Division helps its customers make better products.

When a leading pump manufacturer entrusts National Bearing Division with producing vital pump components, and producing them to the exacting standards required, there are some important reasons why.

This Fairbanks, Morse Turbine Pump combines high pumping efficiency with low pumping costs . . . thanks to close-fitting, precision-machined bronze liners and impellers that are easily replaced on the job, at a big saving over new housings.

These castings—particularly the impeller—have to be "right" . . . free from blow-holes, sand inclusions . . . and must be exceptionally fine-grained. Otherwise lost machining time, before defects are found, can seriously increase production costs.

National Bearing Division was picked to supply castings for the very heart of this Fairbanks, Morse Turbine Pump . . . because of an often demonstrated ability to mass-produce non-ferrous castings to a high standard of uniformity and quality.

If your product requires non-ferrous components, it will pay you to investigate National Bearing Division. We have the foundry facilities and skills that can make important contributions to your product performance . . . with castings in quality as well as quantity. The end result may well save you money, too!

AMERICAN Brake Shoe COMPANY

NATIONAL BEARING DIVISION

4925 Manchester Avenue • St. Louis 10, Mo.

PLANTS IN: ST. LOUIS, MO. • MEADVILLE, PA. • NILES, OHIO • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

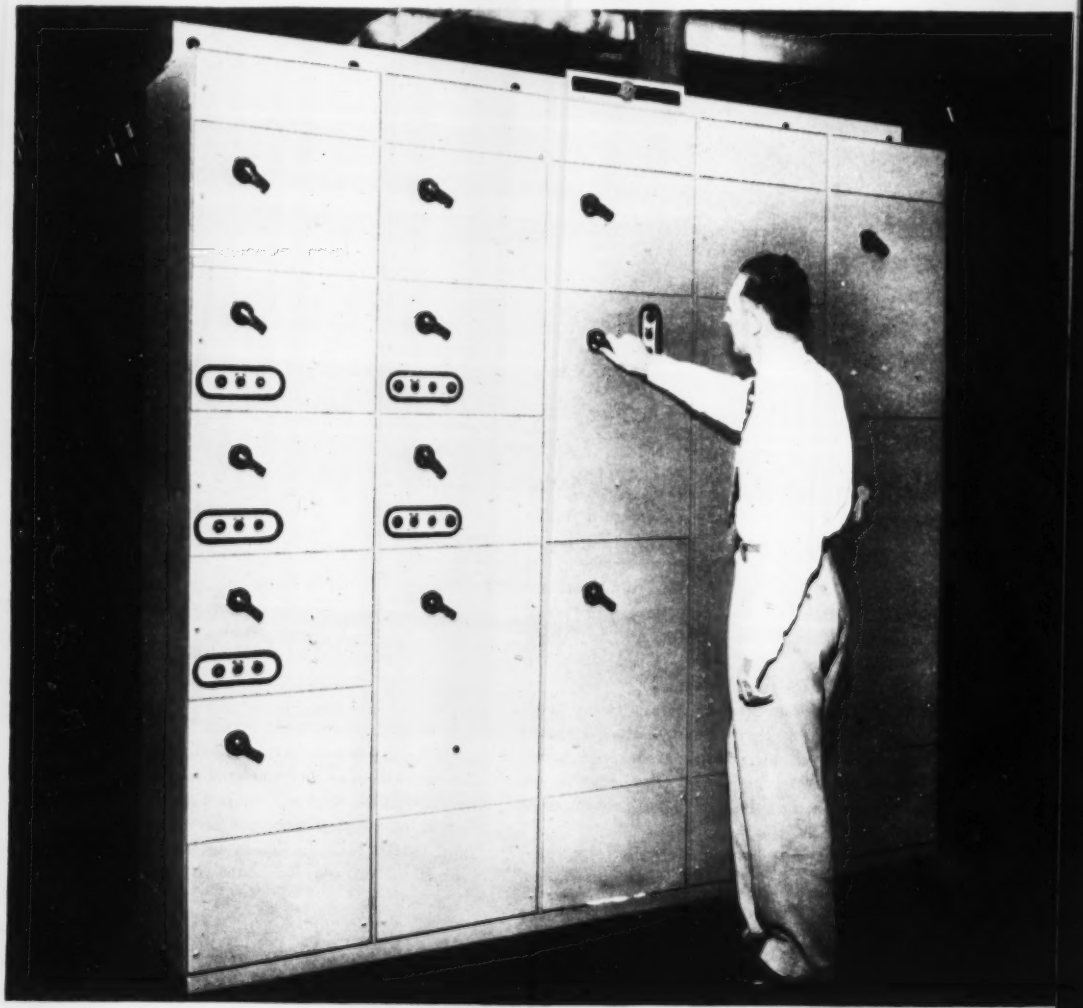
Announcing

For centralized control with greater flexibility

Here's an attractive, versatile new motor control center that you can easily plan, install, and service. Compact—a section is only 20 inches wide, 20 inches deep, and 90 inches high. It will accommodate NEMA Size 1 through 4 starter units back to back.

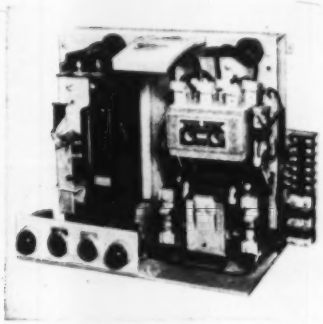
A four-inch wiring trough provides ample space for outgoing wires and cables. Starter units are designed for easy inspection and servicing.

There are many provisions for protecting personnel from mechanical and electrical injury. This G-E motor control center has also been laboratory tested to assure protection against 25,000 amperes short-circuit current. More information on this new, modern motor control center in bulletin GEA-4979A. Write your nearest G-E office today. *General Electric Co., Schenectady, N. Y.*

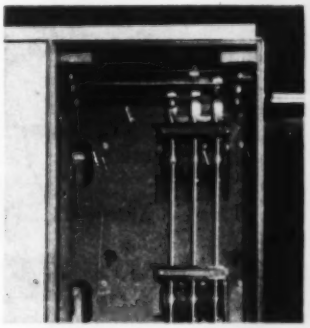


THIS COMPACT, ATTRACTIVE, G-E MOTOR CONTROL CENTER provides the most modern method of controlling a-c motors up to 200 horsepower from a central location.

the NEW General Electric Motor Control Center

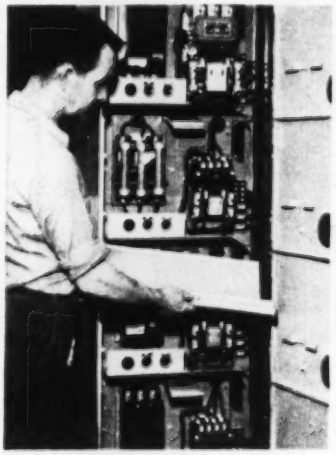


STARTER UNITS ARE COMPLETELY ACCESSIBLE. All components—even the pilot devices—are mounted on a sturdy frame with all terminals front connected.

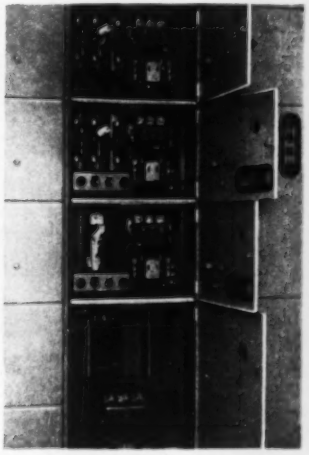


DESIGNED TO PROTECT PERSONNEL. Rear view shows metal barrier that separates starter unit space from bus bars. Vertical section features new "I-beam" construction for strength.

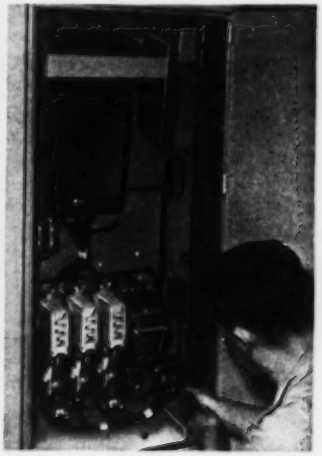
EASY TO INSTALL AND INSPECT. Sturdy, light-weight starter units are easy to handle, and interchangeable because of standardized dimensions and components.



EASY TO WIRE. Ample four-inch wiring trough is completely accessible by removing horizontal metal barriers between units. Barriers isolate and support units as they are slid into section.



VERSATILE. Starter unit sizes and types are in even multiples of 14 inches. Fusible and circuit breaker combinations of the same starter size are interchangeable without changing doors.



EASY TO SERVICE. Doors swing wide (no hinge wiring); unit is easily disconnected from bus and held in test position for protected servicing.

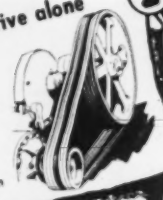
GENERAL ELECTRIC

750-31

What do you do when your v-belts get loose or break?

1 Leave the drive alone

You get more slippage
- ...wasted power
- ...excessive belt wear
- ...uneven sheave wear
- ...less production



2 Slide the motor back

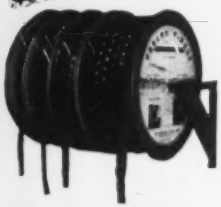
Tight belts get too tight

Life of belts and bearings is reduced

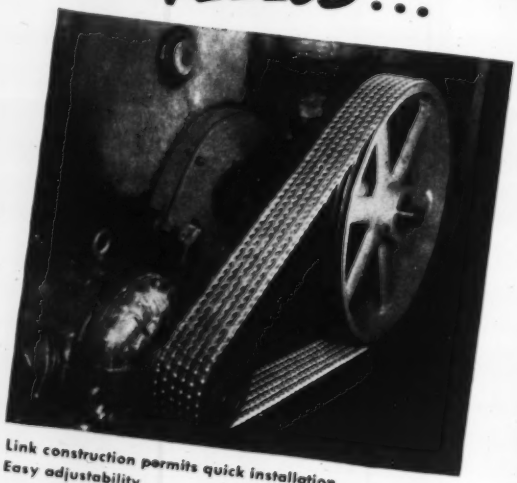
3 Install a new set of belts

Discarded belts mean wasted money

4



Use VEELOS...



Link construction permits quick installation
Easy adjustability
...provides controlled tension on each belt
...eliminates loafers
Keeps your machines running for profitable production

Only with VEELOS...

the adjustable v-belt—can you get *all* these operating advantages. And *only* with Veelos can you eliminate costly v-belt inventory because just four reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts.

VEELOS DATA BOOK...

The plain facts on construction, installation and use of Veelos are included in this illustrated Data Book—write for your copy.

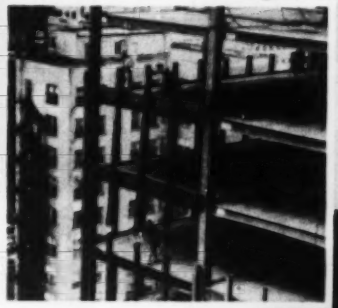
MANHEIM MANUFACTURING & BELTING COMPANY
613 Manheim St., Manheim, Pa.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

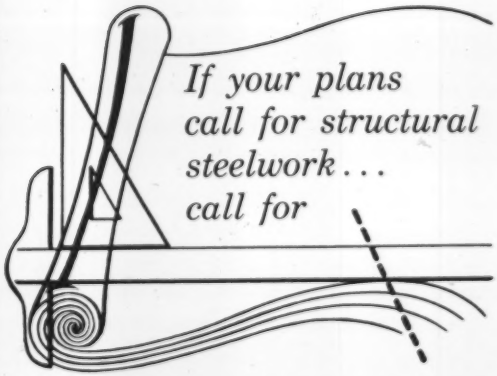
THE DRAMATIC UPSWEEP of glass and steel that distinguishes Chicago's latest skyscraper apartment building was made possible by the unique steel design and construction that holds the floor-to-ceiling glass walls in place. The steel face of the building consists of horizontal facia plates welded across the spandrel beams, with vertical I-beam mullions on 5-foot, 3-inch spacings running the height of the building.



3,600-Ton Steel Framework for Chicago's Unique Glass House

Owner: 860 Lake Shore Drive Trust.
Architects and Engineers: Mies Van Der Rohe, Pace Associates, and Holsman, Holsman, Klekamp & Taylor, Chicago.

fabricated and erected by AMERICAN BRIDGE



TWO 26-story towers of steel and glass connected at basement and ground floor comprise this ultra-modern 288-apartment structure. The unique design and construction of the vertical mullions and horizontal facia plates made possible the framing that holds the glass walls in place. There are no conventional masonry curtain walls. This imposing building occupies a block-long site along Lake Shore Drive and provides a beautiful view overlooking Lake Michigan on Chicago's swanky North Side within a short drive of the Loop. The 2,842 tons of structural steel and the 856 tons of plate steel for the face of the building were fabricated and erected by American Bridge.

AMERICAN BRIDGE DIVISION, UNITED STATES STEEL COMPANY,
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

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50 years of "know how" in fabricating and erecting structural steel — your assurance of a better job.

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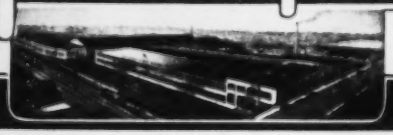
You can't check the bronze or analyze the steel or examine the fits between mating parts of a speed reducer. But you can count on the name of the manufacturer. The name Philadelphia on a product means 60 years of experience in making power transmission equipment. It stands for a company that builds all types and sizes of speed reducing units.

The worm gear reducer shown here is just one unit of a complete line that is built from 3" to 21" gear centers in a wide variety of horizontal and vertical styles. Ratios from 3 5/8:1 to 6300:1 cover any application.

Send for our latest catalog WG-51 which shows complete details of the worm gear units. Please use your business letterhead.

Philadelphia Gear Works, INC.



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a few words about alloy steels

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You've probably had trouble getting the alloy steels you've been accustomed to running. You've got the headache of choosing the best available alternate alloys, plus the headaches of how to machine and heat-treat them.

That's where we can help . . .

Republic 3-Dimension Metallurgical Service combines the experience of your metallurgist and your production men with our 3-man team . . . the Republic Field and Laboratory and Mill Metallurgists. You tell us what you want the steel to do . . . we tell you the best available alternate, help you take the bugs out of using it.

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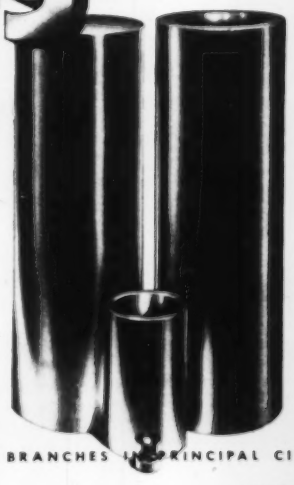

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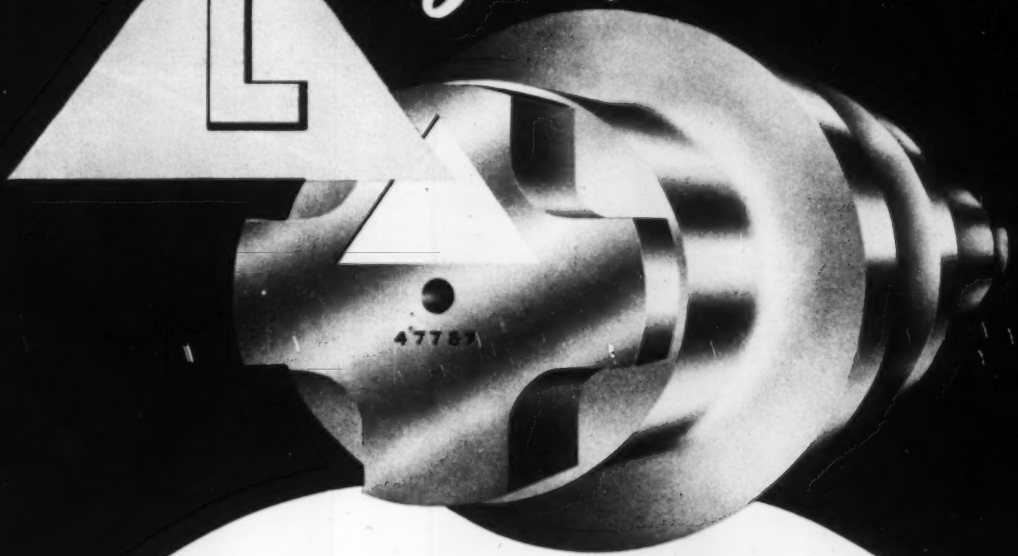

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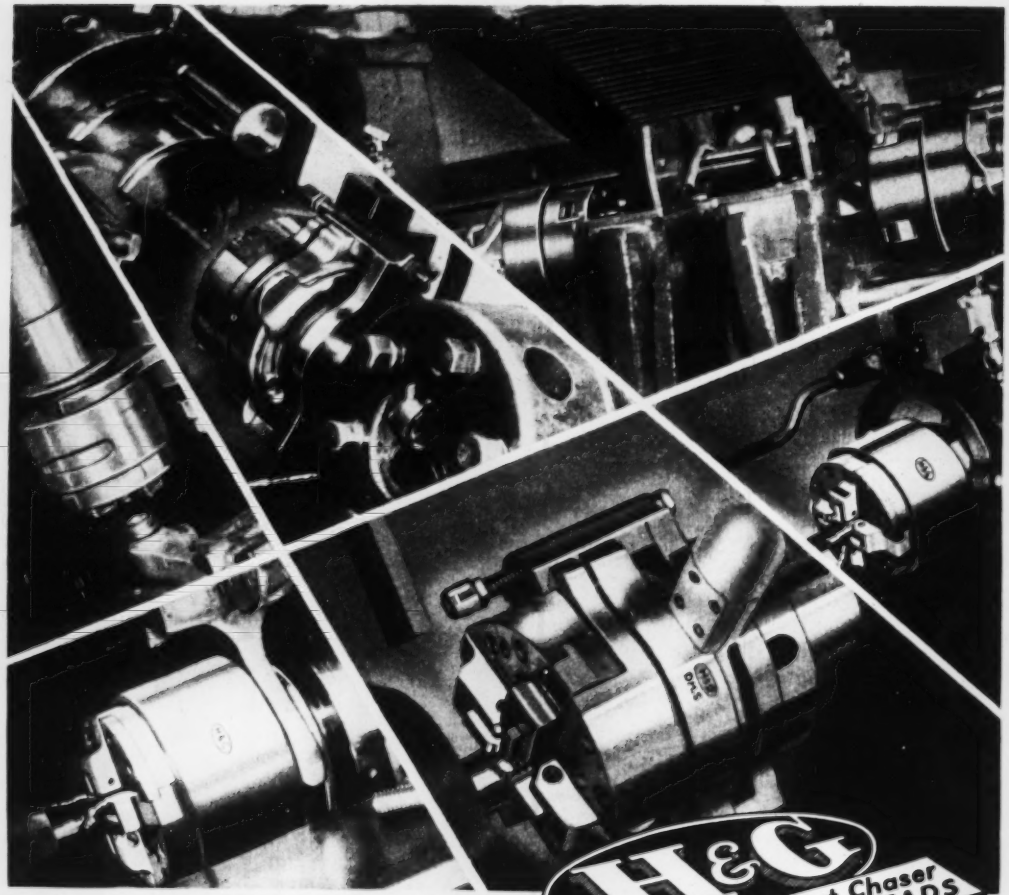

1. Style MM on drill press. 2. Style DM on B. & S. automatic. 3. Style TM cutting taper threads on double-end threader. 4. Style MM on multi-spindle automatic. 5. Style DMS on turret lathe. 6. Style MM on threading machine.

The majority of producers of threaded parts prefer H&G insert chaser die heads

For the last word in thread-cutting . . .
STOP AT
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BECAUSE: 1 H&G cut high quality threads, straight, smooth and accurate to Class 3 fits. 2 Positive trip opens chasers at exact length of thread, an advantage for threading close to a shoulder. 3 Chasers are easily changed by any operator in two or three minutes. 4 The same set of chasers can be used in several styles and sizes of die heads. This interchangeability plus the low price per set reduces chaser inventory and investment. 5 The initial low cost of chasers and their extraordinary life insure new low threading costs.

Check and mail for free bulletins: ☐ How to select proper die head for the job. ☐ Style MM ☐ Style DM ☐ Style TM ☐ Style DMS.

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tool steel has our attention!

Tool steel holds *our* interest. We have always been interested in tool steel. That is why we are the number one producer.

Our interest in tool steel continues in these ways: Our research and development is kept right in step with the latest trends in the industry. Our competent metallurgical staff is available to assist you in any problems you may have. And our conveniently-located warehouses maintain ample stocks so they can supply your needs promptly.

SEND TODAY for the unique Crucible Tool Steel Selector —a twist of the dial gives the tool steel for your application.

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SPECIFY YOUR TOOL STEELS BY THESE BRAND NAMES

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CRUCIBLE first name in special purpose steels

52 years of Fine steelmaking

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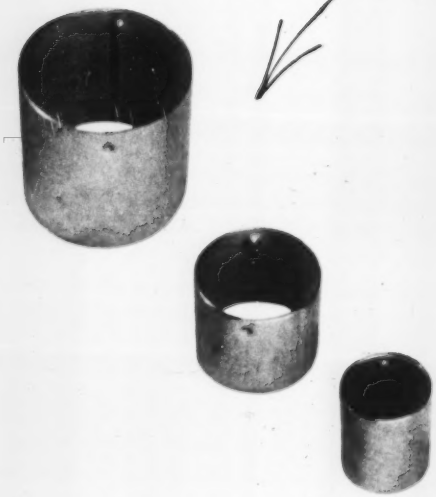
Dentists Can Tell You Why Stainless Tubing for These



Dental molding flasks and saliva ejector stand up under constant use, because they are made from Carpenter Stainless Tubing. The flasks withstand temperatures up to 1700° F., while the ejector is frequently sterilized.

Fabricators can tell you why it's easy to work with *Carpenter* Stainless Tubing!

Reports from dozens of experienced fabricators tell us that there are two reasons why it's easy to work with this tubing. First, analysis-tolerance-finish (and specials such as hardness) are always just the way you want them. That eliminates a lot of problems at the start of any job. Second, they tell us that the personal help they can get on any Stainless Tubing job helps to keep unit costs as low as possible.

When you want to discuss your design or fabricating problems, call your nearest Carpenter Stainless Tubing Distributor. He will be glad to put his experience to work on your essential jobs, and to help you plan for the future, too.

THE CARPENTER STEEL COMPANY
Alloy Tube Division, Union, N. J.
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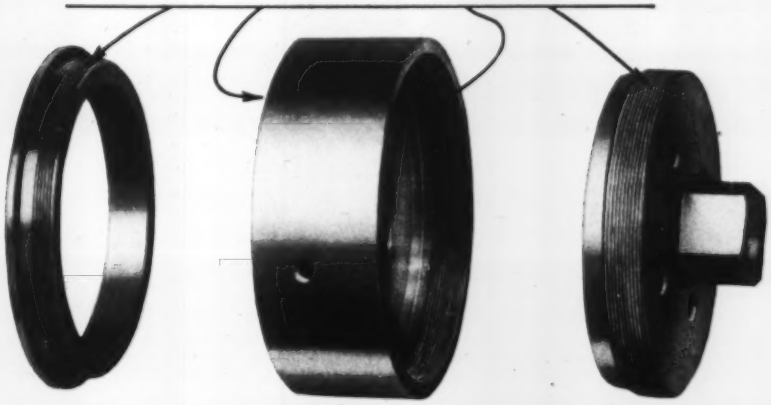
STAINLESS TUBING

—guaranteed on every shipment

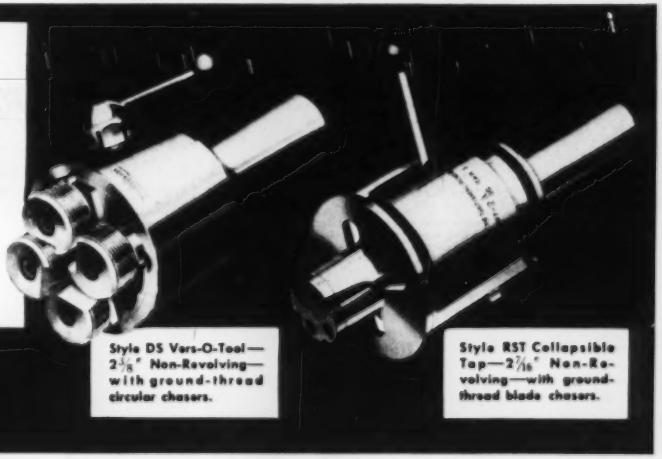
THE U.S. NEEDS YOUR STEEL SCRAP NOW

FOR COMPANION-FIT THREADS LIKE THIS:

ALL 40 PITCH...ALL CLASS 3 FIT



USE NAMCO TWINS LIKE THESE:



Style DS Vers-O-Tool—2⅛" Non-Revolving—with ground-thread circular chasers.

Style RST Collapsible Tap—2 7/16" Non-Revolving—with ground-thread blade chasers.

First, look at the diameters of this precision job. They're turned from 2½" brass and aluminum bars.

Then look at the pitch and the fit—40 pitch, class 3.

The natural companions for such companion-fit work are the Namco threading twins, the Vers-O-Tool Circular Chaser Die Head and the Namco Collapsible Tap—both precision built, both properly balanced to maintain production on large lots.

The exclusive Namco micrometer gauge method of checking thread form permits instant-quick chaser change after regrinding, without disturbing the set-up. Continuous, uniform, uninterrupted production is assured—and you'll get 5,000 or more threads per grind.

Cut production time, cut tool costs, cut reject losses—with these Namco Vers-O-Tools and Collapsible Taps. Ask for Catalog D-51—or send us your "specs."

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Millions

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"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread and annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

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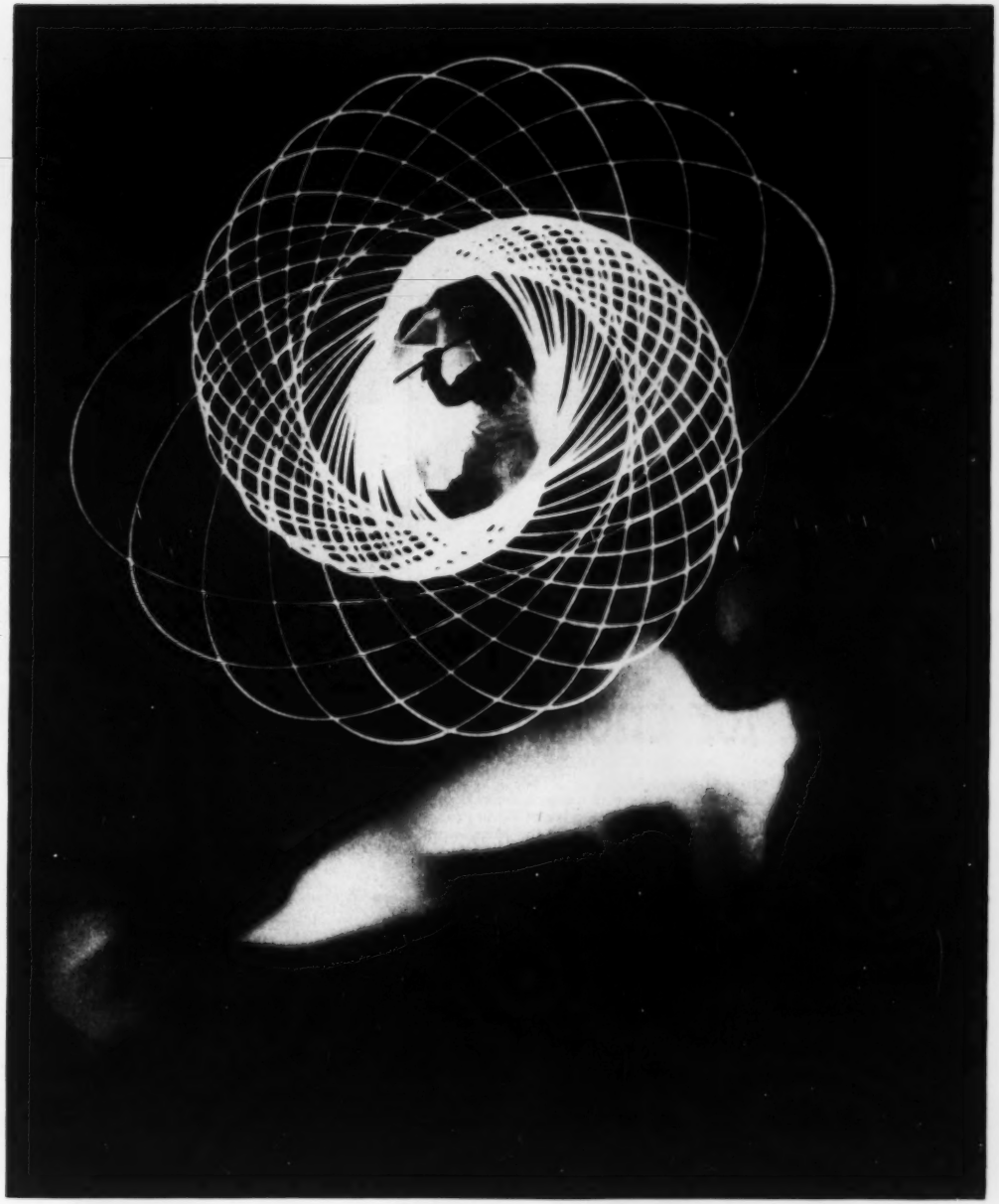

TITANIUM ALLOYS, produced by TAM, are used successfully as deoxidizers and stabilizers and as a source of titanium in steels and alloys. The experience gained in their development and use is available to you through our field staff and laboratory. It's yours by simply writing our New York City office.

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Stronger backbone for the West!

THE construction industry, backbone of western expansion, is now strengthened by Kaiser Steel's production of Wide Flange structural beams – first ever produced west of the Mississippi.

These structural members offer a *bonus in strength*—because they are larger in sectional area than other Wide Flange beams. Yet they're readily interchangeable in all normal structures with beams produced by other mills.

Two sizes are being produced in each group from 8 to 16 inches.

The addition of Wide Flange sections to the standard shapes produced by Kaiser Steel widens the extensive line of popular structurals which can be efficiently employed in the design and construction of modern structures.

More evidence that . . .

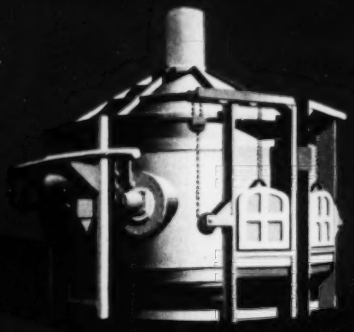
It's good business to do business with

Kaiser Steel

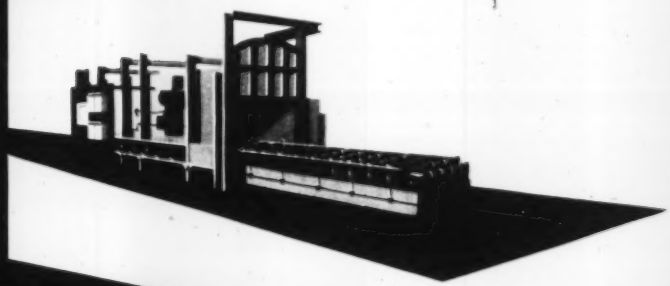
built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products

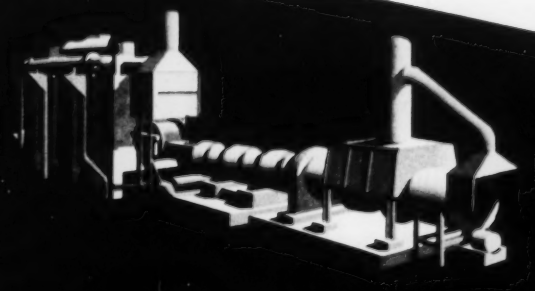
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**



Production heating furnaces for guns, shells, aircraft or engine parts



Prominent among the many services offered by Salem-Brosius to the metal-working industry, both ferrous and non-ferrous, is the design and construction of heating and heat-treating furnaces specially adapted to defense production. Whether you produce aircraft, ordnance, armor, engine parts, or a multitude of similar and associated items, the experienced staff at the Salem Engineering Division is prepared to help you . . . to build furnaces for you that cut cost and add production. Remember, if you have a problem which involves the use of furnaces, blast furnace equipment, or charging and manipulating machines, it will pay you to call on highly diversified Salem-Brosius today.



SALEM-BROSIUS, INC.

SALEM ENGINEERING DIVISION, SALEM, OHIO

BROSIUS DIVISION, PITTSBURGH 15, PA.

Half a cupful...

can sink a boat

Power boat skippers don't frighten easily.

Yet they're scared stiff of gasoline seepage. "It's dynamite," they tell you, "—half a cupful can blow your boat to 'Kingdom Come'."

So they put boat builders right on the spot when it comes to gas tanks.

They want tanks made of metal that sea air, bilge, or gasoline won't corrode . . . metal that's easy to fabricate, to weld gas-tight . . . metal that doesn't form sludge that "gums up" fuel lines and leaves you going nowheres, slow.

Now that's a mighty tall order.

But boat builders filled it. Filled it with a metal that satisfies *their* demands . . . and the strict requirements of the Yacht Safety Bureau. Filled it with a metal that qualifies in every respect for gas tanks, among stock boat builders.

The one metal that meets, and more than meets *all* these requirements, is *Monel*, an Inco Nickel Alloy.

What is Your Problem?

Your metal problem is our problem to work out. It makes no difference whether you are thinking about a maintenance job in your plant or a new line of products you are planning to make.

Now is the time for us to get together with you or your engineers while our staff of metal specialists can carry out whatever research is needed to solve it. You can mail the outline of your problem direct to Inco Nickel Alloys Dept., The International Nickel Co., 67 Wall Street, New York 5, N. Y.

Then the answer can be ready at your hand when these critical times are over and Inco Nickel Alloys are available in any quantity for any use again.

THE INTERNATIONAL NICKEL COMPANY, INC.

INCO **Nickel Alloys** *Monel® • "R"® Monel • "K"® Monel • "KR"® Monel • "S"® Monel • Nickel*
Low Carbon Nickel • Duranickel® • Inconel® • Inconel "X"® • Incoloy® • Nimonics

The Metalworking Outlook

March 10, 1952

About Face

Washington planners have executed an about-face. Just two weeks ago DPA Administrator Manly Fleischmann said the materials situation was easier and the bottom of the barrel in materials would be reached in second quarter—and from then on metals and other products would become progressively more plentiful. Now he has revised his views even further and expects that the bottom will have been reached in the first quarter—with a continually better supply situation ahead. (For details on the change in nonferrous metals supplies, see pp. 91 and 223; for decontrols developments, see p. 211).

Out of Date

NPA Administrator Henry Fowler appears to disagree with his boss, Mr. Fleischmann. The Fowler agency last week came out with second-quarter civilian hard goods allotments that are substantially below the first-quarter levels. Actually the NPA allotments were outdated before they appeared. They don't reflect regional NPA allocations, the substantial supplemental rations for individual manufacturers that have been given out after pressure from the military, nor the additional supplemental rations made possible by the extra 30 million pounds of aluminum and 20-25 million pounds of copper products available for the second quarter. Under the basic NPA allotments, makers of consumer durables generally would get in the second quarter 50 per cent of the steel, 30 per cent of the brass mill and foundry products, 35 per cent of the wire mill products and 20 per cent of the aluminum they got in their pre-Korean base period.

The Pendulum Swings

The fashion in economic thinking shows signs of shifting. The changing materials picture and the hope for decontrols may cause the pendulum to swing further. Within little more than a decade the mode in economic literature has swung from the extremes of a mature or stagnant economy to the present vogue for unlimited economic expansion. But lately unbridled optimism has waned a bit. Some steel producers, particularly, are wondering about the ability of our system to absorb in full the future outpourings of our expanded physical plant.

Controls Compliance Tightens

Be sure your company's affairs are in order. OPS has started to look into 1500 complaints of price violations in the metals industry. To be covered will be scrap dealers, steel warehouses and dealers in nonferrous metals. It's all part of a tightening in OPS's enforcement program.

More Negotiated War Jobs

Negotiated defense awards accounted for 87 per cent of the dollar value of military contracts let during the 1951 fiscal year. That

Production-Engineering News—p. 105 *The Market Outlook—p. 211*

compares with 73 per cent of the dollar value during fiscal 1950. The increase in negotiated awards in fiscal 1951—a trend which is continuing in fiscal 1952—was accompanied by a decline in the small business share of the military procurement dollar from 24.5 cents in fiscal 1950 to 20.9 cents in fiscal 1951.

Money for Defense

By next June 30, the Department of Defense will have $75 billion in unexpended funds. Much of that will have been earmarked for military production programs and subsistence of personnel. But more output programs may be canceled, and even if they aren't, a lot of money will be available this year for new military production plans that metalworking will share in.

Electrical Labor Troubles

Watch for labor troubles in the electrical industry. A three-way tangle complicates matters. First is the bitter rivalry between the left-wing United Electricalworkers and the CIO's new IUE, which has already led to serious jurisdictional disputes. That rivalry contributes to a second problem, that of unusually severe demands on management because the two vie for the best concessions. Both opened negotiations with General Electric last week. Finally, both unions won boosts last year which have never been fully approved by WSB. That issue caused scattered walkouts last week, notably in the East.

Frozen Out in World Scrap

The U.S. is getting frozen out of the world scrap market. Belgium, Italy and Japan can outbid us every time because there are few or no limitations on what they can sell their steel for, and those countries are not restricted in their exports of steel as American producers are. The freeze is hurting us the most in such tight grades as nickel scrap (p. 81). The U.S. Defense Department is considering a plan whereby nickel scrap generated by prime and subcontractors would be returned to mills that originally produced the alloy steel.

Straws in the Wind

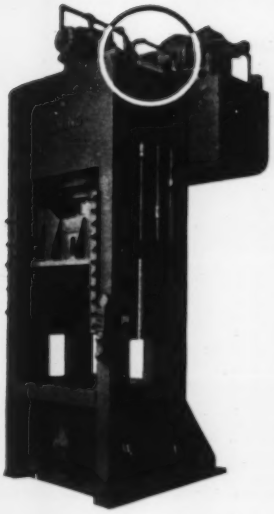
New price control law is expected to contain provision to free prices from regulation if they are well below ceilings . . . Peruvian iron ore will be mined by the Utah Construction Co. on a royalty basis . . . Stockholders of the H & B American Machine Co. voted to discontinue the company's textile machine business and sell its physical assets . . . The ASTE has enlisted financial aid of industrial companies in its scholarship program for engineering students . . . Severe shortage of cold-rolled oriented silicon steel is delaying production of power transformers for electric utilities.

What Industry Is Doing

Outlook is good for capital equipment makers as materials to implement a planned program become available (p. 77) . . . More and more small firms are entering the aluminum extrusion field, but their entrance into defense work is retarded (p. 78) . . . Iron ore from the Lakes region will be shipped by rail to Morrisville, Pa., to get the Fairless Works going (p. 79) . . . Design makes the big difference in industrial wheels (p. 88) . . . Industrial applications of air conditioning are expected to grow mightily in the next half-century (p. 89).

compactness

...a big factor in Clearing's selection of Ross Exchangers



Compactness that lends itself to a neat installation with the hydraulic unit . . . that's a big factor in the selection of Ross Type BCF Exchangers for Clearing Hydraulic Presses.

Whether it's a 150-ton or a 2200-ton press (like those illustrated), the Clearing Machine Corporation can thus furnish *dependable protection* of the hydraulic oil temperature with a minimum of installation time and within a minimum space.

Today, manufacturers of *all* types of hydraulic machines and equipment are profiting from the singular advantages of Ross Type BCF Exchangers. Performance proved, built from durable copper and copper alloy materials throughout, they can be depended upon for long, hard service. Pre-engineered and completely standardized, they are available from stock.

For details, request Bulletin 1.1K5.

ROSS HEATER & MFG. CO., INC., Division of American Radiator & Standard Sanitary Corp., 1431 West Avenue, Buffalo 13, N. Y. In Canada, Horton Steel Works, Limited, Fort Erie, Ont.

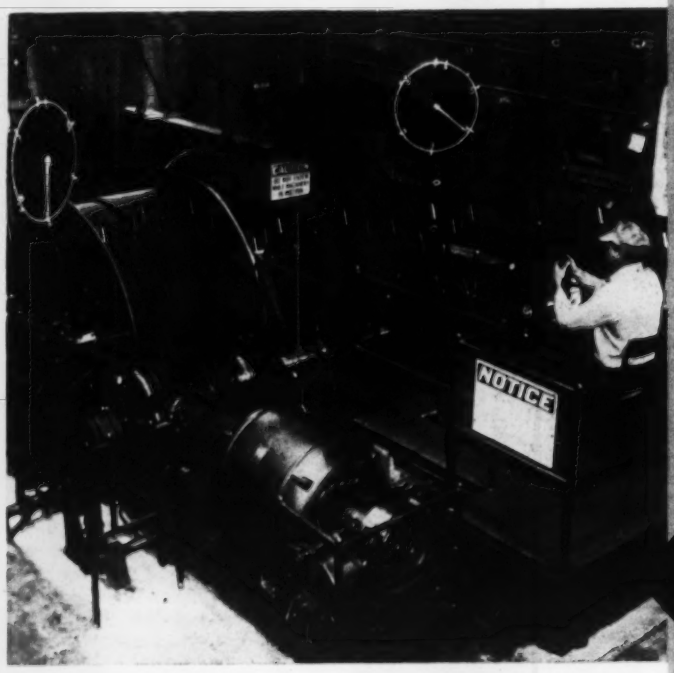
ROSS EXCHANGERS

Serving home and industry

AMERICAN STANDARD · AMERICAN BLOWER · ACME CABINETS · CHURCH SEATS · DETROIT LUBRICATOR · KEWANEE BOILERS · ROSS HEATER · TONAWANDA IRON

Safe, Smooth Ride

for men or stone on this 2-motor MINE HOIST



The *EC&M* Type WB Brake shown on the end of the motor shaft is quick-setting and fast-releasing — maintains high efficiency of the hoist

THE cage creeps to a stop, runs at full speed, or at intermediate reduced speeds. . . . although there's a vast difference in the weight of a passenger load and a stone load, operation is *velvet-smooth* and *safe*.

Speed selection is under the operator's cam-type, multi-speed point, Master Switch. EC&M Frequency Relays automatically switch motor connections to maintain safe operation under all conditions. No. 28 ACCELERATOR Bulletin describes this mine-hoist installation—copy is available upon request.

THE ELECTRIC CONTROLLER & MFG. CO.

2698 EAST 79TH STREET • CLEVELAND 4, OHIO

Unneeded, Unwanted!

Great masses of citizens of the world are questioning the wisdom of their governments in committing their people to extravagant public expenditures. This is true in Red China, France, Great Britain and other nations. It should be equally true in the United States.

Our government has become so large and unwieldy that it is easier for Washington to waste $10 billion dollars than it is for the average citizen to lose track of a 50-cent piece. We hear much talk about curtailing government expense, but little is done about it. Washington takes the attitude that so much of our money goes for defense, which is essential, that there is little opportunity to economize.

If an effective movement for economy is to gain momentum, it must be launched by the people. Where do we start? We in the metalworking industries could well start with the Department of Commerce. Much of its activity is supposed to assist industry. How much of the assistance it renders do we actually want?

In 1940 the department operated on an annual appropriation of about $37 million. The budget report for 1950 showed that $863 million was allotted to the department. This is an increase of $826 million in a decade. Up to World War I, the highest annual cost of running the entire federal government was $782 million. Can we justify such a fantastic increase?

Administration spokesmen think we can. They point out that half of the department's appropriation goes for public roads, another big slice for civil aeronautics, another large sum for the Maritime Administration, etc. They point with pride to the value of work done by the Patent Office, Bureau of the Census and Bureau of Standards.

Admittedly much of this work is valuable and is needed and is wanted. But in an operation of such proportions there is bound to be waste. There is expense for unwanted and unneeded services. The taxpayer is irked because nobody in the administration seems to be concerned about waste.

We think Senator Byrd's estimate of a possible reduction of $9 billion in the federal budget is modest.

E. L. Shaner

EDITOR-IN-CHIEF

TOOL ENGINEERS' WEEK: Readers of this issue will notice that unusual emphasis is placed upon tool engineering. The reason why editors and advertisers are focusing so much attention upon this subject is that the annual convention and industrial exposition of the American Society of Tool Engineers will be held next week, Mar. 17 to 21, inclusive, in Chicago.

Somebody defined tool engineering as "the

technique of planning and equipping the processes required for manufacturing." According to this apt definition, tool engineering is not new. It is as old as manufacturing itself. Long before the turn of the century there were resourceful artisans known as millwrights, master mechanics or tool room foremen who were improvising the methods and tools required to turn out specified jobs. As American manufacturing problems became more complex, the work of these planners of "ways and means" gained new importance. Two decades or more ago, it began to elicit the more formal designation of "tool engineering." Activities of the American Society of Tool Engineers did much to create a national consciousness of the importance of tool engineers.

The demands of tooling up for World War II, for postwar peacetime production and more recently for mobilization for defense have elevated tool engineers to a new high plateau of essentiality. Those of you who go to their convention and show in Chicago next week will find that they have practical answers for most of today's manufacturing problems.

* * *

NOT OVER HUMP YET: Old-timers have a profound respect for the sensitiveness and accuracy of the scrap market as a forecaster of business conditions. Recently observers were quick to note the softness in cast grades of scrap and now there are signs that this is spreading to steelmaking grades. Mills are exercising more selectivity in their acceptance of heavy scrap.

This does not mean that we are safely over the hump on scrap. Supplies still are far from satisfactory. Present efforts to get out dormant scrap should be continued until we know more clearly just what the future will bring forth.

* * *

HOW MUCH SHORTAGE? In last week's grist of news from Washington were announcements that more of the allegedly tight supplies of steel, aluminum and copper will be made available for civilian products in the second quarter than had been considered possible only a few weeks ago. No clear-cut explanation of this windfall is likely to be offered by Washington spokesmen, but there is fairly conclusive evidence that much of the material now being released comes from excessive military inventories.

Whenever an emergency arises, military men have a traditional instinct to figure their needs liberally and then to add a sizable amount as a factor of safety. The result in almost every instance is overbuying. Apparently the Air Force ordered critical materials in volume far beyond reasonably expected requirements.

If every pound of steel, aluminum and copper could be accounted for, how much of a shortage, if any, would exist?

* * *

INTEGRITY, COURAGE: Czechoslovakia's demands for the release of imprisoned American newspaperman William N. Oatis include not only a reduction in United States claims for property nationalized by the Czechs but also early shipment of $17 million of steel mill equipment bought and paid for by the Czechs in 1947 but never shipped because of foreign policy technicalities.

This bribe arouses two reactions. One is that our nationalistic face should be red because of the volume of excellent industrial equipment we sent to Russia after VJ Day. Secondly, with all our vaunted might, small nations thumb their noses at us. In 1805, when we were young and weak in physical strength but strong in determination and courage we won world respect by refusing to be bribed by Barbary pirates. We will not regain world respect today with bloated billions alone. We must also have courage, determination and integrity.

* * *

OUR WISHFUL THINKING: Winston Churchill won another vote of confidence in British parliament last week by a rather encouraging margin. The point at issue was Britain's defense program. In the debate the Queen's first minister was forced to report that the United States is partly responsible for the fact that Britain is far behind in her rearmament program. We have not fulfilled our scheduled commitments as to machine tools. We are behind in other promises.

If we could get far enough away from the passing parade to view important affairs from a sane perspective, we would be painfully aware of the fact that we have been and still are promising the nations of the world miracles beyond our ability to perform in the time specified.

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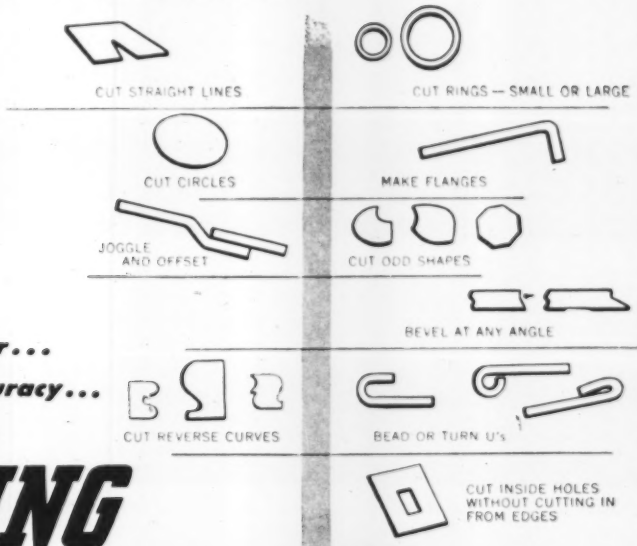

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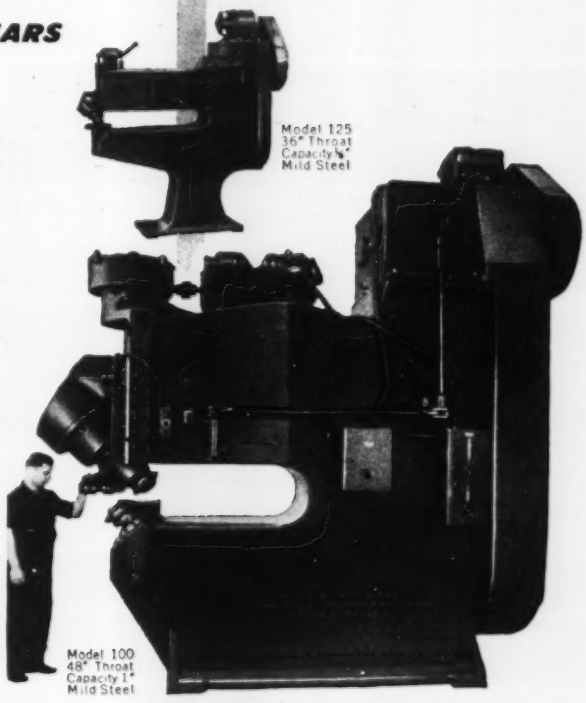

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That's why Inland is adding capacity to give you the steel you need.

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2. Ration cans
3. Frame for army cot
4. Aviation gas truck tank
5. 105 mm. howitzer gun tube
6. Barbed wire entanglement post
7. 5 gallon "Blitz" can for gas or water
8. Forging for 105 mm. shell
9. Fin assembly for 500 lb. cluster bomb

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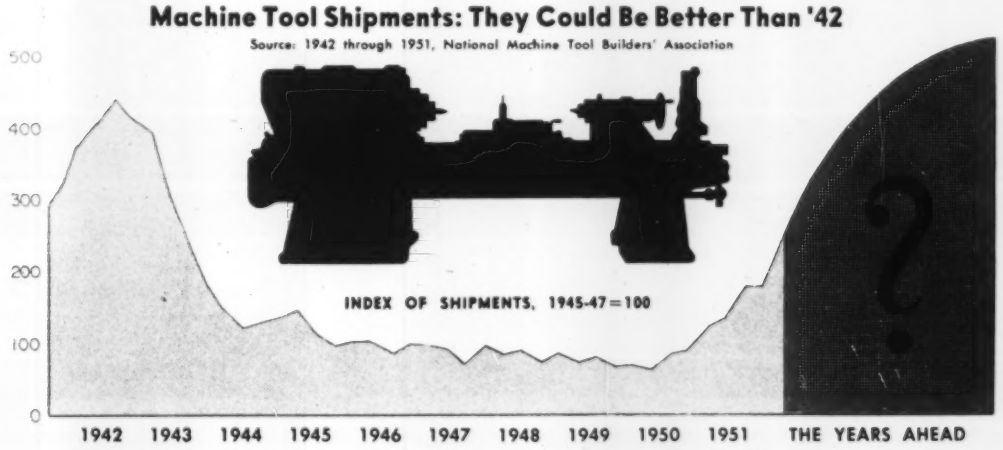


Capital Outlook for Capital Goods

In the works is a government proposal to boost industrial equipment business for the next several years to help assure high defense production

CAPITAL is the business outlook for capital equipment makers over the next several years. It's perhaps the best in history for some producers, notably builders of machine tools, heavy presses, heat treating furnaces and foundry equipment for large castings.

Clay Bedford, special assistant to the Secretary of Defense, is the man behind a plan that's gaining support from the armed services and Defense Mobilizer Charles Wilson and that could continue the boom in the capital equipment industry for years to come.

The Reason Why—In the light of recent cancellations in capital equipment contracts, optimism seems surprising. Not at all. Here's why: Those very cancellations are one reason that the future looks bright. They occurred because the machinery had been ordered to build aircraft parts that had become obsolete. Rapid technological changes, especially in aircraft, assure the need for new equipment. Defense planners are also convinced that we must develop a technique to have reserve machinery just as we are building up reserve capacities for basic metals and for many of the finished defense products. The radical change in the past few weeks in the supplies of steel, aluminum and even copper makes possible for the first time since the Korean War began a big planned program of capital equipment expansion. The capital equipment production we've had thus far has been big, but on a catch-as-catch-can basis.

Politics can also figure in booming industrial equipment production. Although the Bedford recommendations originated as just a defense preparedness proposal, the Truman administration likes it. In this presidential election year, a large capital expansion program would bolster the economy—and political chances of the White House incumbent.

The Mechanics — The Bedford proposal calls for creation of a new top-echelon agency to be called either the Machine Tool Commission or the Industrial Equipment Commission, composed of top industry and government men. The commission would have complete and final direction of the equipment program generally and be responsible only to Charles Wilson.

As its immediate objective, the proposed commission would work to bring machining, fabricating and processing facilities and equipment into balance with the expanding metals supply. It would study particularly three problems: The inadequate supply of large machine tools and heavy presses; the need for more heat treating furnaces and related facilities; and the need for more foundry equipment to turn out large gray iron and steel castings. It also will hunt for other sore spots in metalworking, figure out remedies and put them into operation to cure all deficiencies so that within a year or two there will be no more "bottlenecks" to prevent full utilization of metal-producing facilities in case of full war.

For the Long Pull—In addition, the commission would have a long-range program. That includes future expansion of metalworking facilities in a balance determined by military and civilian needs and the building up of a stockpile of machine tools and other industrial equipment. That aspect of its program would be in the planning stage until the short-term problems get solved. The long-range stockpile idea is a controversial one and will probably be modified considerably in coming months, perhaps in line with some of the criticism it already has received (STEEL, Feb. 18, p. 65).

Although a new commission has

not yet been established, work is already being started by existing agencies on some of the immediate objectives in the program. In machine tools (see STEEL, Mar. 3, p. 39) the present order backlog of $1.3 billion will be swelled as an additional $1 billion in defense orders are placed this year. Peak production of machine tools at the rate of about $100 million monthly, which will be reached by July 1, should continue at that rate all through 1952 and 1953. Now participating in the machine tool program are 1200 subcontractors, and more will be needed.

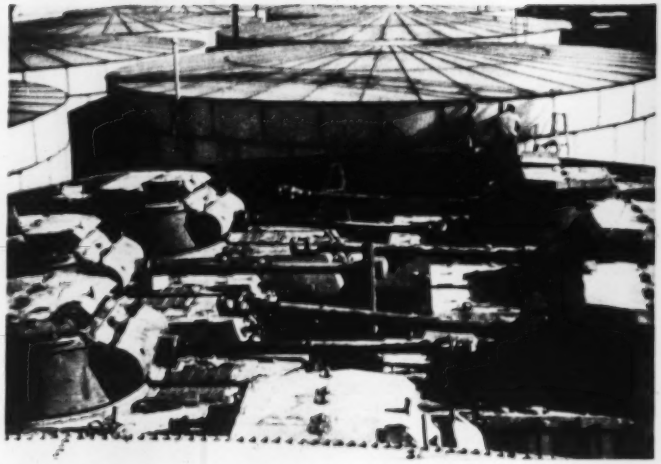
In the Works—Also being implemented is the Air Force $375 million heavy press program, so that bigger aircraft parts can be fabricated all in one piece. Thus far contracts for eight of the units have been let. E. W. Bliss Co. will build a 25,000-tonner and a 35,000-tonner for Kaiser Aluminum & Chemical Co. which will use them at Newark, O. Aluminum Co. of America has a letter of intent to operate 35,000-ton and 50,000 ton units, to be built by United Engineering & Foundry Co. and Mesta Machine Co. Wyman-Gordon Co. will operate two similar presses which Loewy Construction Co. will build. Harvey Machine Co. will get two heavy forging presses of 25,000 and 35,000 tons, to be built by United Engineering and Baldwin-Lima-Hamilton Corp.

In all, some 20 giant presses are planned. One may go to Dow Chemical Co. for magnesium forgings.

Japan No Help in Tool Picture

American industry can scratch Japan off the list of possibilities for alleviating the machine tool shortage. Noble B. Clark, chief of foreign activities of the metalworking equipment division of the National Production Authority, says that there are only about 150 acceptable American machine tools in the stocks on hand in Japan. Of the 26,000 tools he inspected while in the Orient, only 7000 were of American make. Of the 150 he listed as acceptable, only a few were among those critically short in this country.

He added that Japan could produce machine tools of standard design and quality.



NO COFFEE IN THESE CANS: Tanks, armored cars and prime movers, not coffee, are stored in these large containers nicknamed "coffee cans" at the Lima, O., Ordnance Depot. They are part of the 209 long-term storage bins which were sealed up at the depot's large tank storage farm after World War II

Squeeze on Extruders

Production of aluminum extrusions is increasing but not all extruders are prospering

NEWCOMERS in the aluminum extrusion field are finding work to do and some materials, with government help, but they're having a hard time trying to crack into direct defense work.

That's because the biggest defense user of extrusions, the aircraft industry, requires hard alloy and heat-treated extrusions. And the little fellows don't have the proper equipment for this kind of work at present.

Squeezing in Extruders—An example of how the government is helping small extruders get started is the $6 million in capital expansions on which the NPA has issued certificates of necessity to various members of Aluminum Extruders Council. The council represents shops with 12 to 15 per cent of the total capacity of the industry. Also, Aluminum Co. of America has been directed to sell smaller companies more extrusion billets. Alcoa has had some cutbacks in military work, too. Some of that was diverted to smaller firms, permitting them to keep going at a better rate.

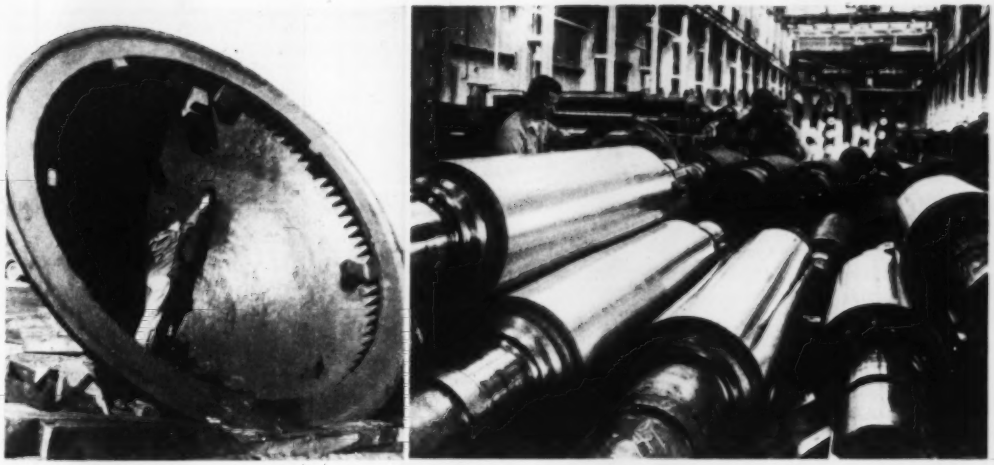
Aluminum extruders number between 40 and 45 firms, and about 25 of these are relatively new to the field. Big four of the industry are Alcoa, Kaiser Aluminum & Chemical Corp., Reynolds Metals Co., and Revere Copper & Brass Inc. which do about 60 per cent of the total business. In 1951 this industry produced 313 million pounds of extruded shapes, tubes and blooms, compared with 255 million pounds in 1950 and 149 million pounds in 1949. Biggest peacetime customer for aluminum extrusions was the building industry which took about 19 million pounds a month.

Look Out For 1952—Outlook for the coming year is optimistic in direct ratio to how well the individual extrusion firm has integrated into the defense program. That is, how well hard-alloy, heat-treated, heavier extrusions can be supplied.

Revere, which reports a 70 to 80 per cent decline in sales for 1951, was caught in a down-draft because it extrudes milder alloys for the most part and could supply only a small percentage of its output for defense applications. Outlook: A further decline this year.

Alcoa reports business for aluminum extrusions should be fairly even this year with last.

The Aluminum Extruders Council, whose member firms are now retarded by a lack of heat-treat-



PROGRESS REPORT: Part of Republic Steel's $75 million Cleveland expansion, the 28-ton bell, left, is being painted before installation as a seal on a blast furnace. First unit to be completed, right, is the roll grinding shop at the 98-inch strip mill. A workman is checking some of the already ground rolls with a micrometer. The program will increase the Cleveland plant capacity by 672,000 net tons a year. First steel will be poured early this year

ing and hard-alloy working facilities, expects more business beginning in the third quarter as many shops are presently expanding with this equipment. N. H. Lambert, sales manager for Precision Extrusions Co., Benseville, Ill., says the business outlook for 1952 is up, but volume will depend upon allocations.

Overriding all forecasts for 1952 is, of course, the supply of aluminum. The lack of metal has kept production at about 50 per cent of capacity so far, but most firms expect an easing in the third quarter allotments. How much depends on the improvement of primary aluminum output through the present expansion program in that field.

Work at Youngstown Bogs Down

Completion of the $150 million expansion program at the Indiana Harbor, Ind., plant of Youngstown Sheet & Tube Co. is running behind schedule. Four of the eight 250-ton open hearths will be finished in April, the last four in December. A battery of 75 coke ovens will be completed in June, and a 1400-ton blast furnace will begin operation in August. The blooming mill, according to present outlook, will not be done until the second quarter of 1953.

To the Rescue: Lake Ore for Fairless Plant

Some 500,000 tons will move by rail from Conneaut, O., to Morrisville, Pa., in 1952. That expedient will be used until 1954 when Venezuelan shipments should start

AN ESTIMATED 500,000 tons of Great Lakes ore will be moved during the coming season to the Fairless plant of United States Steel Co., under construction at Morrisville, Pa. It will be shipped by rail from Conneaut, O.

Shipments will start this spring in time to meet needs of the blast furnace now being readied for production in the second quarter—the first of two now under construction at Morrisville, having a combined annual capacity of 1.2 million net tons. One battery of coke ovens also is scheduled to go into operation in that quarter.

Venezuela: Main Source — The second blast furnace is expected to be blown in in the last half, well before the end of the year; also the second of the two batteries of coke ovens will be put into operation. The coke batteries will have a combined annual capacity of 916,000 tons of coke along with additional tonnages of coal chemicals. Shipments of Venezuelan iron ore are scheduled to begin some time in 1954 and from then on will represent the main source of iron ore supply for the Fairless plant.

Ingot production is scheduled to begin in the third quarter; also initial production of cold reduced sheets, with tin plate output following shortly thereafter. But as the bloom-slab mill may not be completed by that time, the probability is that coils will be shipped east from Pittsburgh as a temporary expedient.

40 Per Cent Finished—The Fairless plant, which will have an initial capacity of 1.8 million tons of raw steel annually, is now 40 per cent completed and will be 60 per cent finished by the end of this half. Although behind on the original schedule, due to restrictions on structural steel and other factors, the work is said to be proceeding at a pace much faster than on any other similar project in the history of the steel industry. More than 7000 workmen, operating six days a week, are hastening completion of the job.

The cold reduced mill, scheduled to get into operation in the third quarter, will have an initial an-

nual capacity of 289,000 tons, and the tin mill 175,000 tons. No definite word is available as to when hot sheet capacity of 235,000 tons will be put into operation; nor the 285,000 tons of bar capacity. Facilities of the National Tube Co. which are being installed at Morrisville will not be put into operation until next year. These facilities include a skelp mill, two butt pipe mills with an annual capacity of 281,000 tons of 1½ to 4-inch butt welded pipe and galvanizing facilities.

Three More Steel Developments

Three further developments appear in the nation's iron and steel industry expansion.

Kaiser Steel Corp. announced that at Fontana, Calif., it will build its third blast furnace, its ninth open hearth, 90 more coke ovens, and two additional stands in the present strip mill. The blast furnace, with capacity of 438,000 tons of pig iron a year, will be completed in the spring of 1953. The open hearth, of 156,000 tons of capacity annually, will be operating by December, 1952.

Yolo Steel & Metal Co. received a certificate of necessity from the Defense Production Administration for a $44 million pig iron plant near Sacramento, Calif. Ore will be obtained in Shasta county, California. The plant is reportedly the first unit of a steel mill to be located near the Sacramento river, west of Sacramento.

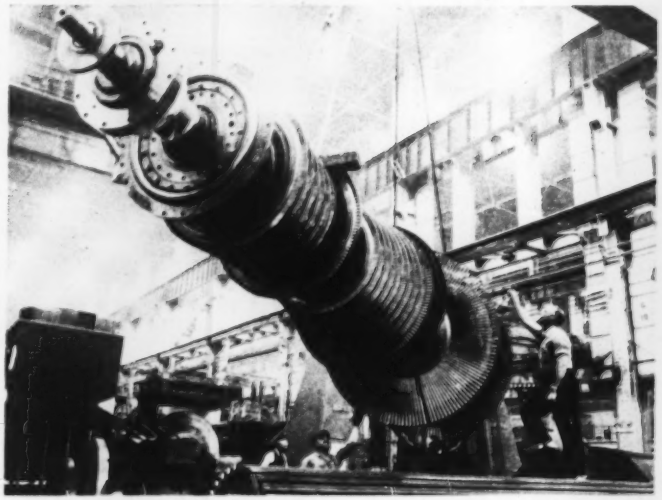
North American Steel Co. will start this spring, probably late April, to construct a pig iron plant at Amanche, Iowa, near Clinton. There will be two blast furnaces with a total annual capacity of 1 million tons, and 94 coke ovens. Ultimately, steel producing facilities are to be added, but first the company will be a merchant iron producer. The company will get iron ore and coal via the Mississippi river.

Cost of North American's initial program will be $66 million, obtained through private financing.

U.S. Steel Will Expand Torrance

The United States Steel Corp. has not abandoned the Torrance, Calif., expansion plan, and it will be activated and completed as soon as it is practical to do so, says Irving S. Olds, chairman. Millions will be spent on additional modern facilities at the plant when it becomes consistent with U. S. Steel's obligations under the national military and defense programs.

Plans announced several years ago for the development of the industry in northern and southern California have undergone changes, says Mr. Olds, because of the priority given to other plants more directly concerned with the defense program.



HEART OF STEEL: This 42,200 pound rotor is the heart of a 50,000-kilowatt generator built at the General Electric Co.'s turbine plant, Schenectady, N. Y. In 1951, GE shipped steam turbine generators with a combined nameplate capacity of 4,098,000 kilowatts to set a new company production record

Lone Star, Sharon To Enlarge

The Defense Production Administration is studying a $50.65 million expansion program at Lone Star Steel Co., Dallas. The company has requested a certificate of necessity for the project and a Reconstruction Finance Corp. loan.

Sharon Steel Corp. has received a certificate of necessity for a $5.5 million expansion at its Fairmont, W. Va., coke works. Plans for the plant are not formulated yet.

Humboldt Mine To Be Developed

Cleveland-Cliffs Iron Co. and Ford Motor Co. have formed the Humboldt Mining Co. to develop the Humbolt mine in northern Michigan. They will spend between $10 million and $15 million to develop the huge low-grade hematitic jasper deposits in the Marquette range. Jasper in many respects is similar to taconite ore.

Copperweld Proposes New Units

Copperweld Steel Co. has applied for a certificate of necessity for expansion of its Warren, O., plant.

At the annual meeting in Glassport, Pa., on Apr. 30, shareholders will vote on proposals which would enable the management to raise up to $20 million quickly.

Taconite Facilities To Increase

With the announcement of a 50 per cent expansion, Reserve Mining Co. will be able to produce eventually 3,750,000 tons of high grade iron ore from taconite in the Mesabi Range. The original program calling for 2.5 million tons will be completed in 1955 with the expansion to be finished about two years later.

The pilot plant at Babbitt, Minn., which will produce 300,000 tons, will be finished in the next few months.

Crisis Past

Greater easing of the wild demand for scrap will come with approach of spring

THE WORST is over in the winter scrap crisis.

With the approach of spring will come a further loosening in supply—for steelmaking as well as cast grades.

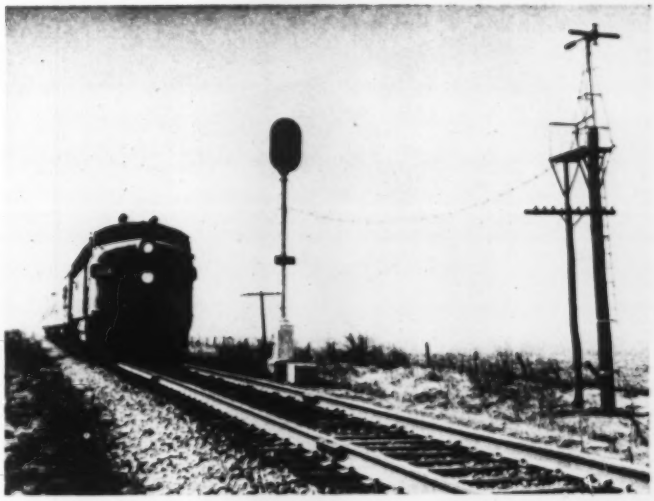
In Retrospect—A combination of factors is causing a letup in the wild demand of two-three months ago. Open weather this winter, cumulative effects of scrap drives and good yield by auto wreckers are prime reasons. Conversion deals went out rapidly. Reduced need by foundries and less demand from electric furnaces gleaned substantial extra tonnage.

Another contributing factor is that many scrap sellers, apprehensive over the general economic outlook, were inclined to push scrap faster. Declines in some of the commodity markets did much to fan this apprehension.

Pulling In Horns—Foundry or cast grades are in ample supply and weak in price. Cupola cast is offered at $1.50 to $2.00 below ceiling; concessions of more than $3.00 can be obtained in unstripped motor blocks. Some traders cut prices by selling cupola cast as charging box cast No. 1. Malleable is not plentiful and holds at ceiling in most areas.

Better flow of steelmaking grades is seen in the market, though in most areas the situation is still nip and tuck. Best indication of improvement in steel scrap: Mills are limiting the freight they will pay. Stocks in the South and Southwest aren't moving to mills with their former speed. One mill even warned brokers not to go long on its account. Mills and foundries have tightened their specifications beyond OPS' rigid ones too.

Breathing Easier—No mills will admit the scrap shortage is no longer a serious matter. Scrap men agree with figures showing capacity operations can be sustained over a long period only by building new blast furnaces. But everyone's breathing easier after scraping the bottom of the barrel.



WINDY CITY WINDMILLS: The Chicago and Eastern Illinois Railroad installed two windmills at a junction point near Chicago. By charging batteries that operate automatic signals, they save about 104,000 feet of precious copperweld wire and eliminate sleet and wind damage to overhead wires

Radiator Makers: Cool to Copper Substitutes

"COPPER and brass radiators have proved fully satisfactory. No other radiator can make that statement."

That is the opinion of Joseph Gurski of Ford Motor Co. and he is supported in it by four other radiator experts. His remark set the tenor of a panel discussion before the Society of Automotive Engineers on the dominant problem of the Auto Industry today.

Still Distant—For every point in favor of a substitute material, the panel could seemingly come up with two against it. And among the experts there was no agreement as to what line of approach to the substitution problem would be most productive. Significance: Makers are nowhere near ready to produce acceptable auto radiators without copper and/or brass.

A little of the urgency has gone out of the hunt for substitute materials because of additional copper available (see pp. 91 and 223).

Another Problem — Automotive requirements suddenly applied to a material not presently used might put it on the scarce list in a hurry, several panel members agreed. In making all-aluminum radiators experimentally, J. R. Holmes, chief engineer, Harrison Radiator Division, General Motors Corp., disclosed, for example, that there is only one source for the salt required in the dipping process and the quantity available currently would be insufficient if Harrison alone were to go into volume production.

Savings of 25 to 40 per cent in the brass mill products contained can be made, Mr. Gurski says, but the life of the radiator is made "measurably shorter".

Twice as Much Boron Steel

Production of boron-treated alloy steel ingots was 70,077 net tons in January, 1952, or nearly 2½ times the average monthly production in 1951, reports the American Iron and Steel Institute. Boron steel accounted for 9 per cent of the total production of alloy steel, excluding stainless, in January. The monthly average last year was 4 per cent.

Total production of alloy steel other than stainless in January, 1952, was 778,495 tons, highest monthly output since World War II, compared with 705,364 tons in January, 1951.

BIG BRUISER: With 500,000 pounds of pressure this massive strength-testing apparatus can pull, press or twist test parts at the Burbank, Calif., plant of Lockheed Aircraft Corp. to prove design safety factors of airplanes. It also can vibrate up to 2000 cycles a minute. Lockheed, designer and builder of it, says it is the most powerful unit of its kind ever built

U.S. Plans Special Treatment for Hardship Areas

SPECIAL TREATMENT in the letting of government contracts is prescribed for areas of high unemployment. Defense Mobilizer Charles E. Wilson ordered government buyers to give special attention to would-be defense contractors—in four areas (Detroit; Providence, R. I.; Scranton and Wilkes Barre, Pa.), and a special committee on labor surplus recommends the same treatment for five more.

Here's what the announcement means according to a spokesman in Mr. Wilson's office:

Means—More government contracts of the types which can be filled in those cities of high unemployment will be let by negotiation; fewer contracts will be advertised for competitive bids.

If a manufacturer in one of the four cities quotes a higher price than a competitor elsewhere, he'll be given a chance to revise his offer downwards. But he won't get the contract at a higher bid. The contractor will also have to assure the procurement agency that a substantial portion of the work awarded to him will be done in a labor surplus area.

To Report—After 30 days the Defense Department and the General Services Administration are scheduled to report to the Office of Defense Mobilization on the effects of the new policy. If they report that firms in the troubled areas can't meet prices quoted elsewhere, Mr. Wilson may decide to allow a price differential.

The four cities covered by the action are among 23 areas certified by the Labor Department as having, or threatening to have, 6 per cent of their labor forces unemployed. Names of the five areas recommended for the same treatment: Asheville, N. C.; Pottsville, Pa.; Lawrence and Brockton, Mass.; and the area including Herrin, Murphysboro and W. Frankfort, Ill.

Textile, shoe and clothing companies will be exempt, says ODM, for any special consideration might have a major effect on the operations of the entire industry.

See the accompanying table for selected metalworking contracts awarded by the government in excess of $100,000 in value.

Product	Dollar Value	Contractor
Muzzle Brakes for 90 MM Guns	119,482	Wheland Co., Chattanooga, Tenn.
Projectiles	(exceeds 250,000)	Pantex Mfg. Corp., Pawtucket, R. I.
Machine Tools and Equipment	297,991	Bell Aircraft Corp., Buffalo
Lathes	131,605	Lodge & Shipley Co., Cincinnati
	(exceeds 250,000)	Reliance Machine & Tool Div., Guide Instrument & Machine Inc., New York
Internal Grinders	534,980	Bryant Chucking Grinder Co., Springfield, Vt.
Radial Drills	133,923	Carlton Machine Tool Co., Cincinnati
Radial Drills	110,670	Carlton Machine Tool Co., Cincinnati
Servo Motors	169,349	Kerfett Co. Inc., Little Falls, N. J.
Spare Parts for Heaters	629,714	Vogt Bros. Mfg. Co., Louisville
	332,849	Herman Nelson Corp., Moline, Ill.
Aircraft Parts	(exceeds 250,000)	Douglas Aircraft Co. Inc., Santa Monica, Calif.
	171,403	W. L. Masson Corp., New York
Bearings	117,060	SKF Industries Inc., Philadelphia
Hoist Assemblies	(exceeds 250,000)	Red Lion Cabinet Co., Red Lion, Pa.
Dispensers	111,582	Douglas Aircraft Co., Santa Monica, Calif.
Valves	167,058	North Indiana Brass Co., Elkhart, Ind.
Hydraulic Test Stands	144,560	Greer Hydraulics Inc., Brooklyn, N. Y.
Oxygen Trailers	243,375	Henry Spen & Co. Inc., Brooklyn, N. Y.
Aluminum Desks	107,425	Jamestown Metal Corp., Jamestown, N. Y.
Filing Cabinets	184,968	Jamestown Metal Corp., Jamestown, N. Y.
Pontoons, T-68	353,083	Kerrigan Iron Works Inc., Nashville, Tenn.
Steel Electrodes	172,772	O. A. Smith Corp., Milwaukee
Refrigerators	119,987	Ice Cooling Appliance Corp., Morrison, Ill.
Ice Plants, 1 Ton	(exceeds 250,000)	Reco Products Div., Refrigeration Engineering Corp., Philadelphia
Printing Presses	(exceeds 250,000)	Arlington Inc., St. Paul

N.Y. State Invites Subcontracts

The New York State Commerce Department announces a new service to gain contracts for the state's metalworking industry. The department has sent letters to 800 prime defense contractors in the northeastern states telling them that 250 New York metalworking firms have 700,000 machine-hours available on 30 types of precision tools available during April, May and June.

Another 270 firms reported that they will have some additional open time on production tools generally, the department says.

The state's action resulted from a survey of 2700 metalworking companies which were questioned as to available time and machines.

Canadian Firm To Mine Titanium

The Terrebonne Titanium Co., Montreal, Que., soon will begin work on a large reserve of titanium ore deposits. The project will cost about $3 million.

Test samples from the reserve, described as "almost unlimited," contain an average of 17.1 per cent titanium oxide and 22.4 per cent iron. It is located only 50 miles from Quebec City.

POWERFUL VOICE: The floating Voice of America, the most powerful radio transmitter ever installed in a ship, is readied for its shakedown cruise in the Caribbean sea aboard the Coast Guard cutter *Courier*. The ship's diesel engines generate 1.5 million volts enabling the Voice to be heard 1000 miles away. Jean W. Seymour of the State Department adjusts the controls

CHECKLIST ON CONTROLS

GOVERNMENT control orders are digested or listetd each week in this "Checklist on Controls." For complete copies of NPA orders, write to NPA Distribution Section, First Basement, New GAO Bldg., Washington 25. For copies of OPS orders, contact nearest OPS district or regional office. For copies of OPS news releases, write David S. Phillips, director, OPS Administrative Services Division, Temporary E Bldg., Washington 25.

Materials Orders

STEEL DISTRIBUTORS—Amendment of Feb. 27, 1952, of NPA Order M-6A designates the corrugating and forming of iron and steel roofing and siding, ridge roll, valley and flashing by steel distributors as a warehouse operation, subject only to the NPA warehouse order M-6A. This change eliminates any uncertainty as to how distributors shall obtain their supplies of sheet and strip steel from mills. Before this action, it was possible for distributors to obtain their mill supplies either as warehousemen or as further converters. The amendment was effective Feb. 27.

AUTO WRECKERS — Amendment of Feb. 27, 1952, of NPA Order M-92 grants the country's 15,000 automobile wreckers an additional 30 days, or until Apr. 1, 1952, to dispose of about 4 million pre-1946 model motor vehicles in their yards to help alleviate the scrap shortage. Many wreckers had complained they would not be able to get rid of their affected inventories in the prescribed time.

SULFUR — Amendments of Feb. 28, 1952, of NPA Orders M-69 and M-94 prescribe new reporting forms for use by consumers and suppliers of sulphur and sulphuric acid. Amendment of M-69 also limits nondefense uses of sulphur to 90 per cent of the amount consumed in 1950, and amendment of M-94 limits amounts of sulphuric acid that can be retained for captive use by suppliers of it. Both amendments were effective Feb. 28.

CRYOLITE—NPA Order M-99 issued Feb. 29, 1952, is an interim conservation order, limiting the purchase of both natural and synthetic cryolite pending establishment of full allocation, expected in May. The order became effective Feb. 29.

LEAD—Amendment of Mar. 3, 1952, of NPA Order M-38 removed all restrictions on the use of lead. Inventory restrictions were modified to permit consumers to carry a 60-day lead inventory, instead of a 30-day supply. Reports will still have to be made under M-38, so that NPA can continue its surveillance over lead supplies and consumption.

TIN PLATE, TERNE PLATE — Amendment of Mar. 4, 1952, of NPA Order M-24 establishes three new classifications of irregular or off-grade tin plate and terne plate to help move off-quality products that have been backing up at warehouses and mills. The amendment was effective Mar. 4.

SELENIUM—Amendment of Mar. 3, 1952, of NPA Order M-91 was issued so that all suppliers of high purity selenium are covered. When the order was issued there was only one supplier; now there are several. The amendment was effective Mar. 3.

TUNGSTEN—Amendment of Mar. 4, 1952, of NPA Order M-81 permits analytical laboratories to obtain small quantities of tungsten without obtaining government authorization. The amendment was effective Mar. 4.

Price Regulations

BRASS, BRONZE INGOT — Ceiling Price Regulation 127 issued Feb. 27, 1952, is a dollars-and-cents ceiling price regulation on domestic brass and bronze ingot. CPR 127 was effective Mar. 3. Ceilings established by this order are in line with the level of prices now being charged by manufacturers of about 80 per cent of the total ingot production.

COKE, CHEMICALS, GAS—Amendment 7 of Supplementary Regulation 13 of the General Ceiling Price Regulation extends from Feb. 29, 1952, to May 31, 1952, the interim price regulation covering coke, coal chemicals and coke oven gas. Amendment 7 was issued Feb. 29, 1952.

RESELLERS OF STEEL—Amendment 1 of Ceiling Price Regulation 98 provides price increases for resellers of iron and steel products, principally affecting reusable iron and steel pipe and industrial products, new heavy gage boiler tubes, imported industrial steel products and new products. The amendment effective Mar. 4, 1952, is designed to meet most of the pricing problems which have arisen since issuance of CPR 98 last November.

USED RAILS—Amendment 29 of the General Ceiling Price Regulation makes it clear that sales of used rails, trackwork, rolling stock and other demolition projects used for steel scrap remain subject to price control. Amendment 29 was effective Mar. 8, 1952.

Appointments in Washington

Dr. J. B. Austin, director of research, United States Steel Co. and chief of the company's research laboratory at Kearney, N. J., was appointed member of the Committee on Chemical Warfare, Research Development Board, Department of Defense.

Dr. Norman A. Shepard, chemical director, American Cyanamid Co., was appointed chairman, Committee on Materials, Research & Development Board.

Dr. Randal McGavock Robertson, long with the Office of Naval Research on problems of mechanics and materials, was appointed ONR's science director.

John C. Houston Jr., who has been serving as vice chairman for Stockpile & International Programming, was appointed executive vice chairman of the Department of Defense Munitions Board.

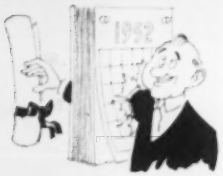
A. E. Van Cleve, vice president of Crucible Steel Co. of America, was appointed special assistant for mutual security matters to Under Secretary of the Army Archibald S. Alexander.

Herman D. Moskowitz of Schiavone-Bonomo Corp. and past president of Institute of Scrap Iron & Steel Inc., was appointed deputy chief of Scrap Section, Iron & Steel Division, National Production Authority. W. J. Belzler, Republic Steel Corp., was appointed assistant chief.

Newly appointed section chiefs in Iron & Steel Division, National Production Authority are: F. H. Davidson, Jones & Laughlin Steel Corp., Bars & Semifinished Steel; E. F. Cark, Weirton Steel Co., Sheet and Strip; D. R. Pratt, Bethlehem Steel Co., Rails & Track Accessories; Dr. William G. Theisinger, Lukens Steel Co., Plates.

Windows of Washington

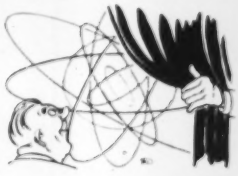
By E. C. KREUTZBERG *Washington Editor*



CONTRACT SETTLEMENT
. . . seek advance opinions

CLAYTON ACT LACKS TEETH
. . . FTC wants it amended

TAXPAYERS TO BE REFORMED
. . . Revenue Bureau will lead way



ATOMIC PATENTS UNVEILED
. . . ideas for industry

THERE'S ONLY one way to finalize your government contract settlement: Get it audited and passed on by Comptroller General.

No settlement can become absolute until that official audits it — which may be years later. The uncertainty of such an arrangement is disturbing to industry.

Section Eight—The Comptroller General, asked about the new Section VIII (Termination of Contracts) of the Armed Services Procurement Regulation, says only that it represents a big improvement in termination procedure as compared with that of the World War II period.

He admits it embodies many of the recommendations he made then. But he will continue to retain complete freedom to question any and all contract settlements not only for fraud but for illegal and/or excessive payments.

A Gimmick—One device you can use to insure yourself against any future upsetting of your termination settlement. Under present policy any government disbursing officer or his department head may ask the Comptroller General to make an advance audit and express an opinion on its propriety and legality.

Once the Comptroller General renders such a judgment, he can never reopen the case. Hence you can, by prevailing on disbursing officers to get this advance opinion, put yourself in the clear insofar as future questioning is concerned.

Split Decision . . .

A majority of the Federal Trade Commission asked Congress to amend the Clayton antitrust act. It says "The glaring defect . . . is that an order under that law has no force or effect without subsequent court enforcement."

It asks an amendment similar to the Wheeler-Lea amendment to the Federal Trade Commission Act that would provide finality and penalties for violation of cease and desist orders.

Dissent — But Commissioner Lowell B. Mason (who has many friends in Congress) filed a statement of "noncurrence."

The impetus to secure finality of Clayton act orders, he said, lies in the field embraced by the Robinson-Patman amendment. "Giving finality to such orders," says Mr. Mason, "puts the cart before the horse and makes a bad matter worse."

Controversy—The Robinson-Patman Act, since the day of its birth, has been the subject of bitter controversy at all levels of government and business. Before giving finality to orders under such a statute, Congress should first take stock of the act.

Have interpretations of the commission and the courts been in harmony with what Congress intended? Does anyone know the boundaries of lawful conduct under the act? Those are questions Congress should examine, says Commissioner Mason, before considering the request for more power.

Define It—The commission majority also asked for a better Clayton Act definition of illegal interlocking directorates. It says certain types of interlocking relationships which impair competition are not now covered by the act.

The New Leaf . . .

Signs are accummulating that much of the new fervor stirred up in the Bureau of Internal Revenue in the wake of the recent firings of tax collectors on charges of dishonesty and improper conduct will be spent "reforming" taxpayers.

Latest announcement by Commissioner Dunlap warns of a drive against "excessive and unreasonable expenditures claimed as deductions in tax returns . . . particularly those relating to lavish travel and entertainment expenses, executive expense allowances, business gratuities, and disguised remuneration in the form of personal living items furnished to corporate officials."

The bureau is going to great lengths to keep taxpayers honest. Reports have the bureau's agents going to automobile sales agencies to ascertain whether a man paid as much interest on a car as he deducted.

No Cost At All . . .

Worthy of scrutiny not only by the growing number of companies in the field of nuclear developments but by all industry are lists of patents released by the Atomic Energy Commission for royalty-free, non-exclusive licensing. They often contain new developments with wide applications possibilities. AEC Release No. 410 has two such items.

Patent No. 2,584,801 covers a novel clamp, suspended at the end of a cable and operated by remote control, for extracting vertical pipes in near inaccessible locations. Patent No. 2,584,816 covers a new electronic electroplating system that will maintain a constant potential between the cathode and the plating solution despite various changes in conditions which may occur during the electroplating operation.

POWER + PRECISION

Another example of the ability of Morgan engineers to design to suit your requirements is this new edging mill.

This vertical mill has the power and rigidity for heavy reductions and the precision required for light edging. The overhead pinion drive with slidable spindles simplifies uncoupling the rolls for roll changing. The bottom wedge adjustment permits quick and accurate pass alignment. The housings are hydraulically traversed with the additional feature of fine screw adjustment through the twin yokes. The complete unit is so designed that no water or scale can enter the housings.

Why not discuss *your* mill problem with our engineers?

RM-44

MORGAN CONSTRUCTION CO.

WORCESTER, MASSACHUSETTS

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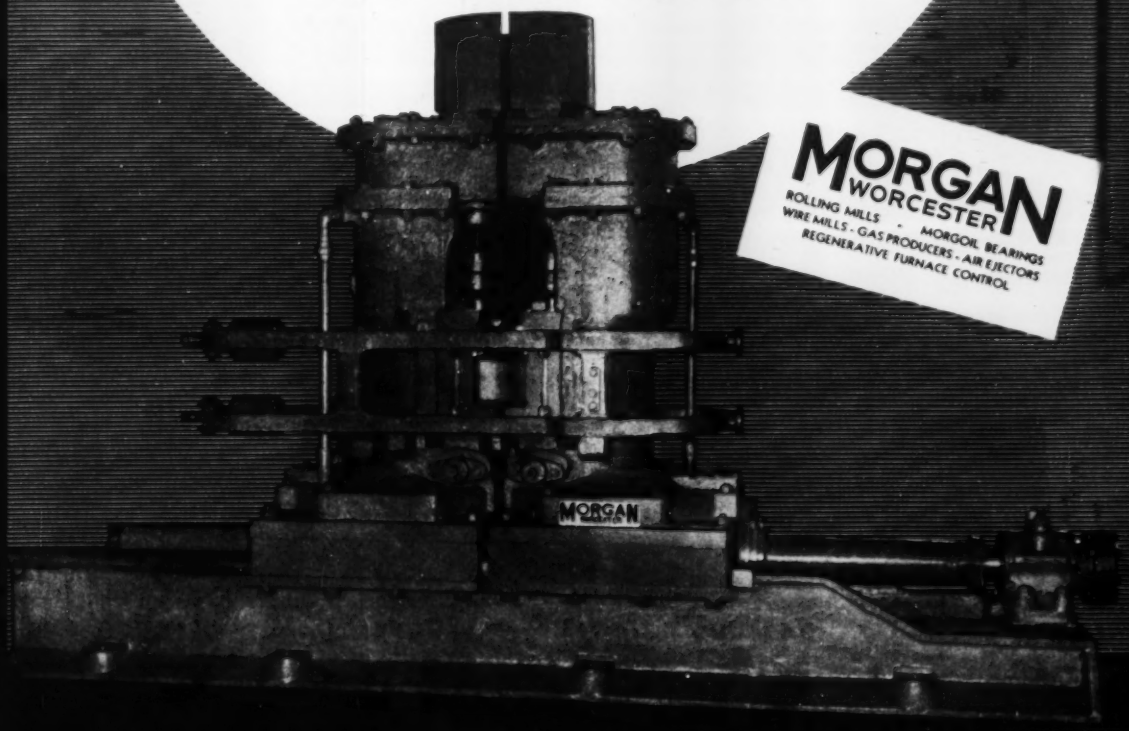

MORGAN
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ROLLING MILLS - MORGOIL BEARINGS
WIRE MILLS - GAS PRODUCERS - AIR EJECTORS
REGENERATIVE FURNACE CONTROL

CHANDLER METAL FASTENERS*
BUILD QUALITY IN EVERY PRODUCT

Quality in the finished product depends upon the care exercised in the selection of its components . . . And no one produces finer metal fasteners than Chandler! All the metallurgical knowledge and manufacturing skill of our company are concentrated upon one specialty—the production of uniformly high quality cold wrought metal fasteners. It pays to buy your fasteners from specialists.

Cold Wrought Metal Fasteners by

Chandler Products Corp.

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SOUTH AMERICA, TAKE IT AWAY! United States manufactured equipment, new and old, is a familiar sight in Latin America. At left, a 17-year-old Model 641-K White truck makes a routine heavy haul over the 62-mile mountainous Ibague-Armenia road in Colombia for the Ferrocarriles Nacionales de Colombia. In Sao Paulo, Brazil, a fleet of 42 Twin Coach busses, some of which appear in center, makes the regular 280-mile trip from Sao Paulo to Rio in six hours running time. At right, a LeTourneau D Roadster Tournapull helps build a new Cuban highway

U.S. Ships More than Dollars Overseas

Over and above planned government activities, exports of American know-how are increasing through private business. Sometimes it's a two-way proposition

U. S. EXPORTS of industrial know-how and other intangibles are on the increase. One thing about exporting American know-how and technical data—there's a big market for it.

The Mutual Security Agency reports that on Feb. 1, 1952, there were 380 American specialists taking part in 41 technical assistance projects in 12 Western European countries. In addition to these government-sponsored plans for shipping American savvy overseas, there's a constant but unorganized flow from private business. For example:

Patent Rights — Two firms in Belgium have teamed up for production of the first American-style electric trolley coaches to be made in Europe under American designs and license agreements. Ateliers Metallurgiques of Nivelles, Belgium, has been licensed by Marmon-Herrington Co., Indianapolis, to produce the coaches. Ateliers de Construction Electriques de Charleroi, Belgium's largest maker of electrical equipment, will manufacture the traction motors and controls, as licensed by Westinghouse Electric International Co.

Engineering Counsel and Administration — Thompson-Starrett Co. Inc., New York, builders of the Grand Coulee Dam, will head a group of Turkish-German associates to construct the $35 million Sariyar hydroelectric project in northeast Turkey. Charles T. Main, Boston engineer, designed the project.

Engineering Information — Aircraft Gas Turbine Division, General Electric Co., and DeHavilland Co. Ltd. of England, have agreed to a "full interchange" of knowledge in the aircraft gas turbine field. DeHavilland has been working on gas turbines since shortly after the Battle of Britain in 1940. General Electric built the first jet engine in the U. S. in 1942.

The government encourages those private deals. Manly Fleischmann, Defense Production Administrator, says: "The international exchange of scientific knowledge and technological capacity is just as important as the international exchange of materials."

Early Reaction in England

Though the United States has not shipped one ton of steel under the steel-tin-aluminum swap with Britain, there are already repercussions to the agreement there. Steven J. L. Hardie, chairman of the British Iron and Steel Corp., official administrative agency for the nationalized British steel industry, resigned. The issue over which Mr. Hardie quit was the Conservative government's decision to raise the maximum price on iron and steel to help defray increased costs of obtaining iron and steel. Part of this increased cost will derive from buying American steel at high prices and selling it to English consumer industries at lower prices.

British consumer industries are looking forward to the steel, nonetheless. This quarter's allotments have been disappointingly low, and 800 workers have had to be let out at the Humber Motor Works, Coventry, and 1000 more are laid off from the Belfast shipyards. Some say this is only a forecast of what will happen in the entire midland engineering industry until the supply picture becomes easier.

Belgium Has Record Year

Output of steel ingots and castings in Belgium was 5,504,382 tons for 1951, compared with 4,110,480 tons in 1950. Translated, that means a monthly average of 458,700 tons, highest tonnage ever obtained in Belgium.

The U. S. and Canada are ordering appreciable tonnages of Belgian steel products. Prices usually quoted for the U.S.: Merchant steel, $130 per metric ton; 3/16" sheets, $160 per metric ton; 1/8" sheets, $170 per metric ton. Deliveries vary from two to three months.

The scrap market shows signs of hesitation, but prices are still very high.

SKYHOOK IN ACTION: WHEELS WAY UP IN THE MIDDLE OF THE AIR
. . . applications everywhere, but new orders show business is coasting

Wheels: A $22 Million Industry Keeps Things Rolling

ACCENT on efficient materials handling in industry today is causing designers to look twice at the lowly wheel.

In the $1250 million materials handling industry, industrial wheel makers last year rolled in sales of about $22 million. That total doesn't include the power truck field, which by itself is large.

Tilt—A far cry from the first hand-hewn wheels are some of the Buck Rogers type wheels used in industry today. One caster mounts a saucer-shaped wheel at a 45-degree angle. The design reduces ground clearance while maintaining maximum wheel size and lowering tipping hazards.

Another type is shock mounted unit: The hub attaches to a spring like those used in clocks and the other end is fastened to the caster frame. These are said to be the largest type in the world and are used for moving B-36s in manufacture. Bassick Co., Bridgeport, Conn., makes them. Bassick also is doing well with a floating hub type—the wheel's shock absorbing mechanism is built into the hub.

To maintain sales volume and strengthen their competitive positions, the forty-odd fabricators of industrial wheels (not railroad or automotive types) are stressing standardization of size and designing for a combination of strength, light weight, swiveling and rolling qualities for specific uses. One reason for the movement: Industrial users and defense contractors now buy to rigid specifications. The Munitions Board is spearheading a drive to standardize wheel specifications for all branches of the armed forces.

Preference—The services presently lean toward pneumatic wheels in their purchases. They cushion shock in rugged service and move easily over soft soil. Gaining favor with industry are stamped wheels with pneumatic and semipneumatic tires. Drop-center rim type wheels (like on autos) are finding more industrial applications.

Gray iron wheels, say some producers, are losing ground to other types because they lack concentricity as cast. A partial successor (in smaller sizes and for light loads) seems to be powder metal. Forged wheel makers are aiming for longer wearing product. Rose Truck & Caster Co., Detroit, specializes in this field. New designs make possible carrying heavier loads on fabricated steel wheels. Market Forge Co., Everett, Mass., finds that type about as low in cost to produce as forged or cast.

With stress on light weight, aluminum cores are gaining more acceptance for many tough jobs. Solid rubber and plastic wheels have become increasingly important for jobs where corrosion is a factor. Rubber companies supplying tires find their orders now contain more strict specifications as to tensile strength, elasticity, size and tread design.

Wheels of War — The defense program is having a definite effect on caster and wheel makers. Faultless Caster Corp., Evansville, Ind., finds a growing market is for aircraft engine stands and scaffolds.

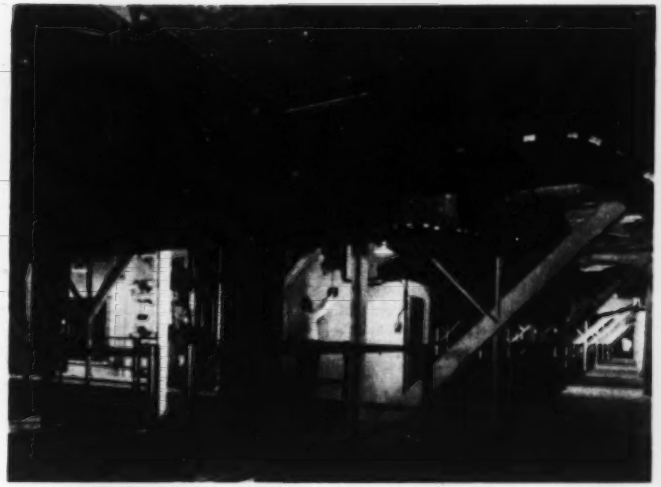
Vehicles for guided missiles require sturdy wheels, too. Brass wheels for shell loading plants aren't in heavy demand because these facilities were kept intact on a standby basis.

Coasting—Despite the gain from defense work, most wheel and caster makers report shipments currently exceed sales. Order backlogs are off about 15 per cent from last year at this time. Materialswise, forging quality and cold-finished bars pose the most serious problems to fabricators. Bearing purchases are relatively easy to make. Some companies, like Electric Wheel Co., Quincy, Ill., make most of their own.

Even though orders are tapering off at present, wheel makers are optimistic about the future. Geneva Metal Wheel Co., Geneva, O., points to the great potential market for the industry's product. Not only are labor and handling costs under the magnifying glass, but industry is finding there's little economy in (or desire on the part of workers to) lift and carry things manually.

Liquid Mothballs for Vehicles

Army Ordnance has developed a new jelly for "mothballing" military vehicles which will preserve them for shipping or storing in any climate for four to six years. The jelly, a vinyl material, is sprayed on the vehicle, tires and all. It hardens as a pliable elastic cover which may be peeled off when the vehicle is needed. Ordnance says it costs $25 to $30 to prepare an automobile and $40 to $50 for a large truck.



AIR CONDITIONING DUCTS AT WESTERN ELECTRIC CO.
. . . industry emerges as a major market for such equipment

Freshening Up Production

Watch for greater use of air conditioning by industry, especially for precision work

AIR CONDITIONING will become an increasingly important tool to aid industrial production in the next few decades.

That's the prediction of Carrier Corp., Syracuse, N. Y., a major producer of air conditioning equipment; of H. K. Ferguson Co. Inc., New York, an industrial builder; of Riester & Thesmacher Co., Cleveland, an air conditioning contractor; and of Perfect Circle Corp., Hagerstown, Ind., a user of air conditioning in the production of piston rings.

$1 Billion Industry—Last year air conditioning sales reached $1 billion for the first time in the 50-year history of the business according to Cloud Wampler, Carrier president. He predicts that the next half-century will see the industry increase five-fold over today's levels to reach a volume of $5 billion annually.

At least a quarter of that gain will come from industrial air conditioning because industry is emerging as one of the four major markets for conditioning equipment. Two of the markets—multi-story buildings such as offices and hotels and commercial establishments such as stores and theaters—have provided the bulk of demand thus far. But York Corp., York, Pa., another important producer of air conditioning equipment sees "industrial air conditioning becoming more widespread both for processing and human comfort." A fourth market, home-use, also shows signs, like industrial applications, of substantial growth. Westinghouse Electric Corp. President Gwilym A. Price says domestic air conditioning in the next ten years may have the sales advance that television has had in the past seven.

Where and Why—Industrial air conditioning today has many applications. Perfect Circle uses it to prevent hand perspiration in production operations. Taft-Peirce Mfg. Co. installed it in inspection rooms at its Woonsocket, R. I., tool plant. Rauland Corp., Chicago, depends upon it in the laboratory, as well as in production of radio, communications and sound equipment. Kollsman Instrument Division of Square D Co. needs it in the assembly of precision aircraft instruments at Elmhurst, L. I., N. Y. Air conditioning enabled Simonds Saw & Steel Co. to move its heat-treating department into the same building with other operations at Fitchburg, Mass., and thus take advantage of the economies in straight-line production.

Industrial air conditioning will never be universal because it's expensive to install in old plants, although even there its installation in laboratory and other special areas is usually feasible. But industry is increasingly recognizing its value as a production tool and specifying it in new buildings. Many new manufacturing facilities going up today that don't have it are so designed that air conditioning eventually can be installed economically. Austin Co., Cleveland, particularly specializes in what it calls "convertible" construction.

Compressors Allotments Expand

Makers of small compressors (15 hp and less) will get increased allotments of carbon steel, stainless steel, brass mill products, copper wire products and aluminum in the second quarter, but allotments of alloy steel and copper foundry products will be cut, says the National Production Authority.

Those manufacturers will get following percentages of base period amounts, some military supplies in 2nd quarter: 80—carbon steel, 75—alloy steel, 55—stainless steel, 60—brass mill products, 38.1—copper wire products, 57.2—copper foundry products, and 16.5—aluminum.

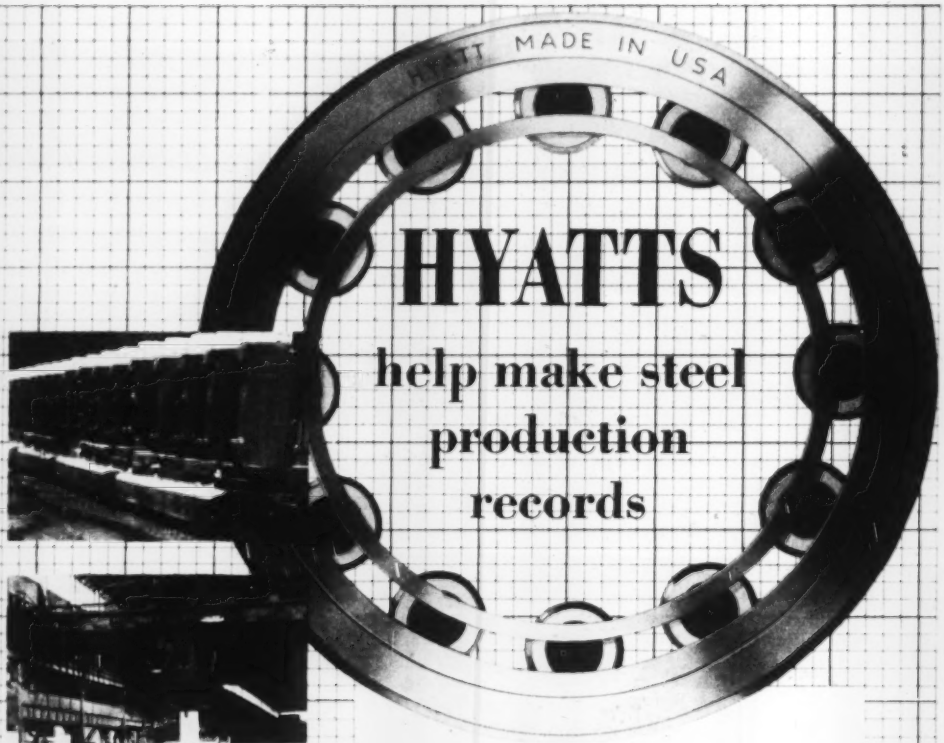
Ocean Ships To Join Ore Fleet

Ten large ocean freighters will join the Great Lakes ore fleet, several in time for the 1952 shipping season, the Army Corps of Engineers says. The ships are scheduled to start the Gulf-to-Lakes waterway journey in April.

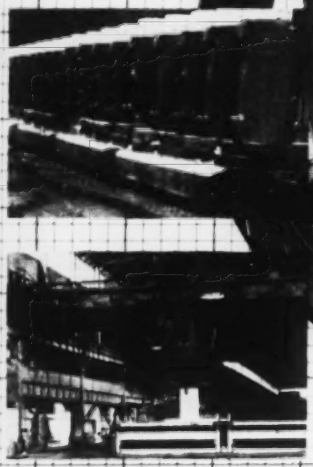
Three of the vessels, measuring 710 feet, will be cut in two in order to make the New Orleans-to-Chicago trip. Three other ships, made especially for Lakes ore duty, and four C-4 type freighters will make the trip without cutting. They will be fitted for ore carrying at Great Lakes shipyards.

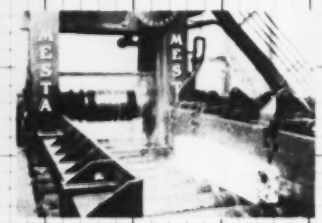
NSA Orders 10 Per Cent Layup

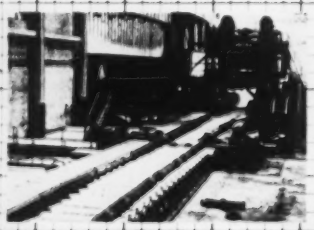
Ten per cent of the remaining 515 government-owned vessels now operated by private shipping interests was ordered returned to layup by the National Shipping Authority. The order is in line with declining shipping rates which indicate a surplus of tonnage.



HYATTS
help make steel production records







LAST YEAR'S RECORD—an all time high—showed a production of 105,000,000 tons—8,000,000 tons more than the steel industry produced in 1950, and plans for 1952, if not interrupted, call for still greater tonnage.

To attain and maintain such a high production level, operating equipment must necessarily be at peak performance at all times.

And to help keep the mills operating successfully at this continuous pace, Hyatt Roller Bearings are serving and saving in tables . . . cars . . . cranes . . . mill motors . . . and other auxiliary equipment.

Thus, proved by performance, easing shock loads, extending equipment life, and reducing operating costs, Hyatts are the preferred steel mill bearings for new equipment or changeovers. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey.

HYATT ROLLER BEARINGS

By H. C. TUTTLE *Detroit Editor*

Mirrors of Motordom

Auto builders last week made a strong case for a share in an aluminum and copper windfall. Moderate amounts of copper would enable them to boost output 20 per cent

DETROIT

TELEPHONE and telegraph wires hummed; transportation routes between Detroit and Washington were unusually busy last week as automotive executives hastened to present their case to win a share in a copper and aluminum windfall.

Because of the return of surplus metal by the military and because orders of some companies were not as high as expected, Defense Production Administration had 30 million pounds of aluminum and 20 million pounds of copper products to distribute as supplemental allotments to civilian industries. Most of the material will be assigned for the second quarter because of lead times, but a little of it may be available for earlier delivery if a consumer can prove he needs it desperately enough.

A Matter of Balance—To support their case, auto men gave particular emphasis to the unemployment in Detroit, to the fact that late in February they had to refuse an extra 10 per cent steel allotment because no extra copper in comparable quantities was available at the time and to the belief that moderate improvement in auto assemblies could help avert a slow-down in civilian business that may be a threat to the whole economy.

Auto makers had already submitted to NPA their figures for the amounts of controlled materials required for production of 1 million cars in the second quarter and the additional quantities needed for 1.1 million. The plan had been to permit production of 930,000 cars and 220,000 trucks next quarter. Extra copper and very little more aluminum could enable the industry to run at a 20 per cent higher rate than it has been expecting.

$64 Question—But even higher production ceilings set by NPA aren't the entire answer. Will the agency again issue fewer CMP tickets than are necessary to achieve goals? The industry's 930,000 cars were to have been built this quarter with a copper allocation sufficient for only 800,000 units; the deficit was to have been made up from inventory and through ingenuity in the way of substitute materials. While NPA paid high tribute to the auto makers' reputation for being able to get over apparently insurmountable hurdles in that fashion, it failed for quite a period to realize that auto men had to have something to use as the substitute. Aluminum was that product, and the planners finally saw that the amount they were going to release to the auto makers (enough for 800,000 cars) would not permit of its use for new substitutions.

Having seen the light once, NPA probably will be more realistic with its aluminum allocation this time. Copper allotment, however, will undoubtedly be held down to give the substitution incentive. Steel, on the other hand, may be allotted liberally.

No Trouble — Anticipating the likelihood of higher auto production in second quarter, STEEL queried a number of automotive suppliers to determine whether the higher requirements could be met without strain.

Each one said it could set up output immediately; all they need is new schedules from the auto makers and CMP tickets from the government.

Some suppliers of such diverse items as screws, automotive trim fabric, gray iron and malleable castings, gears, radiators and electrical components reported they are selling at 40 per cent or more under this period a year ago. Where defense production has increased in these companies it is nowhere near an important enough part of the business to offset the cutback in automotive work.

PLASTIC AGE: Manufactured on a commercial scale by the Glasspar Co., Costa Mesa, Calif., this low-cost, light-weight plastic automobile body supports the weight of its makers. It will not dent or rust, and cracks can be repaired in a matter of minutes. Weighing 185 pounds, it sells for $650

Most auto makers themseves are going to meet their first quarter output quotas, an indication that spot shortages are no longer prevalent. But not all companies will build the allowable number of units this quarter because of: Production losses during model changeover (the reason for Ford now working six-day week), and inventory exhaustion as a result of labor strife in several key suppliers (this has given Nash trouble).

Some other factors which have had an adverse effect on some producers are a slow market and insufficient supply of CMP tickets. Studebaker, Chrysler and General Motors have been holding themselves in check to prevent overbuilding.

Detroit Cool to Plastic Body

No one in Detroit automotive circles is able to work up much enthusiasm for the new plastic body which achieved publicity through its write-up in *Life* a

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couple of weeks ago. The joint development of Naugatuck Chemical Division of United States Rubber Co. which supplies the raw material and Glasspar Co., Costa Mesta, Calif., which is producing the body, it recalls to mind the famous pictures taken back in 1939 showing Henry Ford the elder taking an ax to the trunk lid of his plastic car. The only thing which seemed to suffer in that experiment was the blade of the ax. Nothing appears to be about ready to give 'way in the new Glasspar body, either, with four men standing on the hood.

Dormant—Pearl Harbor brought to a standstill the work being done at Ford along that line and it has layed dormant since. As one of the first experiments into plastics for automotive bodies, the Ford endeavor was said to be quite expensive, and the men who worked with the material were never able to keep its bulk from showing. To get strength equal to steel the soy bean fibrous material had to be half-inch thick.

The Naugatuck-Glasspar body apparently has solved some of the problems which Ford faced. Thickness of the material, which is a club-sandwich combination of vibrin polyester plastic and layers of glass fiber, is two-tenths of an inch. The lines of the publicized body, a sports roadster, give no evidence of bulk or difficulty in forming complex curves. Its originators claim low cost for it, saying the first body style bears a price tag of $650. It is to be fitted to a 100-inch wheelbase chassis by the buyer.

Selling Points—The material has strong appeal because of these features: It does not dent and cracks caused by impact with such stationary objects as trees can be repaired at home at low cost; it is completely rust proof; it is light weight.

From a production standpoint, according to Naugatuck's vice president and general manager, the body can be formed without expensive molds and heavy equipment. Sheet metal stampings involve tremendous expenditure on both counts, and management would want mighty good reasons before it undertook to replace the present presses and dies with others to make something "just as good." Many automen believe that before steel is junked as the basic automaking material and plastics are accepted, if such a development could occur, there would be at least one intermediate step—aluminum.

Auto, Truck Output
U. S. and Canada

	1952	1951
January	418,486*	645,688
February	454,000*	658,918
March		802,737
April		680,281
May		695,898
June		653,682
July		522,858
August		571,442
September		506,758
October		558,971
November		480,199
December		404,547
Total		7,180,979

Week Ended	1952	1951
Feb. 9	102,406	116,071
Feb. 16	111,821	178,141
Feb. 23	110,542	199,478
Mar. 1	115,918	177,567
Mar. 8	118,000*	180,577

Sources: Automotive Manufacturers Association, Ward's Automotive Reports. *Preliminary.

Chrysler Engine Stands Up

Engine men in General Motors Laboratories have had an ill-concealed chip on their shoulders ever since Chrysler Corp. started talking in public about the potentialities of its engines with the hemispherical-shaped combustion chamber. When Chrysler's Vice President and Director of Engineering, Jim Zeder, announced the six changes needed to convert the standard 180-hp firepower engine into the 310-hp "K-310" without supercharging (STEEL, Jan. 82, p. 94), people at General Motors and elsewhere in the industry said, "We've got to be shown."

Before the SAE last week Mr. Zeder told how the engine lives up to its advance billing—and then some. Using regularly available premium fuel and making the changes to improve volumetric efficiency but keeping the compression ratio unchanged at its present 7.5 to 1, Chrysler is pushing 309 hp out of one of its experimental engines (not the K-310 incidentally, which has a fractionally higher compression ratio). Mr. Zeder then described how through the high-compression route, plus volumetric efficiency and using super fuel, another engine, identical in size with the standard firepower, had 353 horsepower coaxed out of it.. Compression ratio of this engine was raised to 12.6 to 1 by pushing the piston higher into the head.

Yet another engine, standard in all respects except for the increase in compression ratio to 12.6 to 1 and using high-octane fuel, developed 14.9 per cent greater horsepower than the basic "firepower" engine. From this Mr. Zeder concluded "that when higher compression becomes desirable or fuel quality makes it possible, this cylinder head will respond to the increased demands on it better than any other combustion chamber with which we are acquainted."

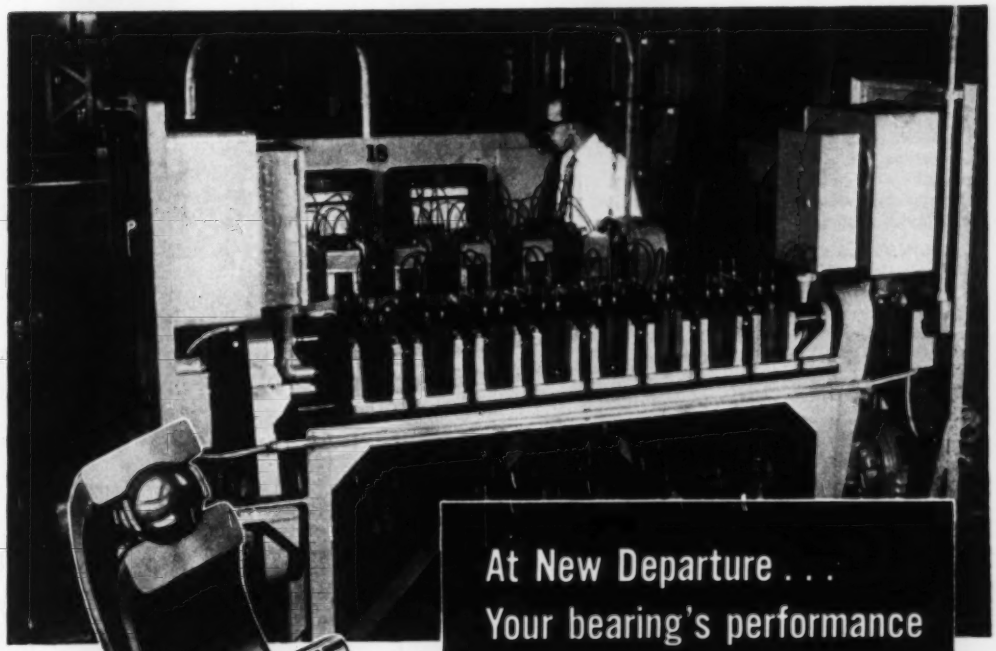
Now They Give Cars Away

Leave it to the boys out of Livernois Avenue in Detroit to come up with a new pitch when the market gets to dragging. Oster & Barry Motor Sales, Hudson dealer, has a gimmick which Mr. Barry says results from their gamble that the used car market will be strong six months from now. O & B's deal is to sell a 1952 car now, any model, and in six months or 10,000 miles replace that car with another new one of the same model at no charge.

Asked what will happen if the dealer is not in business in six months, Mr. Barry said "We're not going out of business, but maybe the factory will back us up."

Piston Ring Problem Solved?

The Air Force requirement that piston ring faces be honed or lapped has given makers a lot of grief and a high rate of rejections at this final stage of manufacture. A long sought after machine which would finish each ring individually has now been developed and was installed last week in a Muskegon ringmaker's plant. M. C. Hutto Hones Inc., Detroit, which engineered the three-headed honing machine expects this finishing technique to be widely accepted as chrome rings become more commonplace in the automotive industry.



At New Departure . . . Your bearing's performance is tested and proved *before* you use it

Considering the big part ball bearings must play in the efficient operation of your machine, it is important for you to *know*, and in *advance*, how the bearings will perform.

For example, you need to know what results may be expected from each type of grease under varying conditions.

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What is the determining factor of seal-bearing life?

How operating conditions contribute to metal fatigue?

Which has the most effect on grease life—speed or load?

Lubrication selection.

. . . a monograph, "Grease Lubrication of Ball Bearings," by New Departure's Manager of Research, Development and Design, will be mailed upon request. 163

Nothing Rolls Like a Ball . . .

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BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS
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To get maximum tube life per dollar... Ask the experts!

THERE'S only *one* high temperature tube steel that can give you maximum tube life per dollar—the best life/cost ratio—under a particular set of heat, pressure, corrosion and oxidation conditions.

To make sure you get the right steel, go to the metallurgists of The Timken Roller Bearing Company. They're recognized authorities on high temperature steels. With 20 years experience in research and with 25 different analyses at their disposal, they'll help you select the one best steel for your operating conditions. And you're assured of uniform, high quality steel in every tube because of the Timken Company's rigid quality control from melt shop through final tube inspection.

Let our "RSQ"—Research, Supply, Quality—solve your tube problems. Ask the experts! The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

This month's report is on:

DM STEEL

Has unusually high creep strength for a pearlitic steel, good stability up to 1200°F., fairly good corrosion and oxidation resistance. Has 2 to 3 times the life of carbon steel where corrosion is not severe. Recommended for cracking furnace tubes, hot oil lines, superheater tubes, high temperature steam piping and forgings for accessory parts.

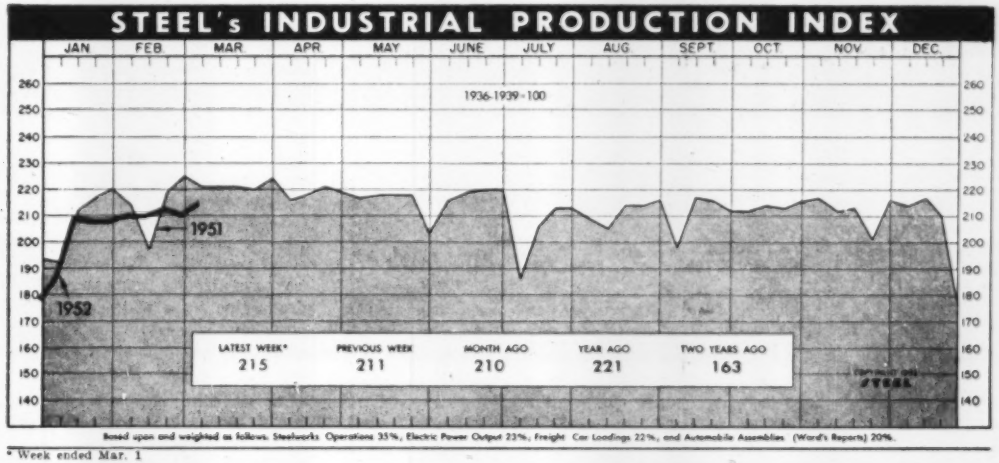
23 TIMKEN® STEELS FOR HIGH TEMPERATURE SERVICE

Carbon	Sicromo 2	Sicromo 5S	16-13-3
Carbon-Mo.	Sicromo 2½	Sicromo 5MS	25-20
DM-2	2¼% Cr.-1% Mo.	Sicromo 7	25-12
Silmo*	Sicromo 5	Sicromo 9M	35-15*
DM	4-6% Cr.-Mo.	18-8 Stainless	16-25-6*
2% Cr.-Mo.	4-6% Cr.-Mo.-Ti.	18-8 Cb	

**Not available as seamless tubing at the present time.*

Pictured above is a direct-reading spectrometer, used in the Timken Company's Spectrographic Laboratory. It chemically analyzes a molten heat of Timken steel in just 40 seconds, makes possible precise control of the steel's properties.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



* Week ended Mar. 1

Industrial production index surges to highest point in three months. Encouraging to business are easing of curbs and healthier inventory levels

MARCH CAME IN like a lion—from a production standpoint anyway.

The Record Speaks—Basic industry's output surge as the new month got underway is seen in STEEL's industrial activity index for the week ended Mar. 1. Pegged at 215 per cent (1936-1939 = 100), the index was at its highest point since the pre-holiday push in mid-December. Gain from the previous week's mark was 4 points.

All components of the production index moved up. Steelworks operations and automobile assemblies set new peaks for 1952 to date. Freight carloadings recovered from the week before, but are still well below last fall's marks. Electric power output, meanwhile, continued strong at a point slightly below its phenomenal level of recent months.

Basis of Optimism—Encouragement to a spring business upturn comes from several directions. One is in the controls winds blowing from Washington. The administration seems more firmly committed to a policy of a painless defense program that won't dislocate the civilian economy severely. A further easing of curbs on nonessential production is under consideration.

Another support is seen in the inventory level, which is getting back to normal for many products. Sluggish retail trade caused inventory jitters that worked back to the manufacturing level and hurt many producers. Buyers are still pessimistic in ordering, possibly too much so. When they begin to see clearer business skies, the orders to manufacturers should tend to overcompensate for today's caution.

Busy Year—For metalworking, the outlook appears promising. With employment on the upgrade, according to an NPA survey (STEEL, Mar. 3, p. 48), and both defense and civilian hard goods requirements to be satisfied, the year could be a busy one for metalworking.

FRB Index Inches Up . . .

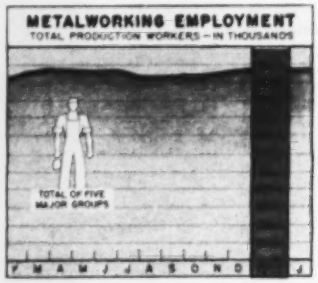
Total industrial activity shows signs of moving out of its six-month stall, but the Federal Reserve Board's latest index doesn't substantiate it completely. In January industrial production stood at 219 per cent of the 1935-1939 average, up one point from December, but down two from January, 1951. The reason for the drop from the year-ago mark: Durable goods production was up 5 per cent, but nondurables fell off about 6 per cent. Major consumer durables were up about 3 per cent from December, but off one-third from January, 1951. Mineral output was unchanged. February totals should cause a further slight rise in the FRB index.

Records Are Routine . . .

Amid demands for decontrol of steel and reports of overabundant supplies of some products, steel mills continue their unprecedented production pace. A new alltime record was scheduled to be set in the week ended Mar. 8, says American Iron & Steel Institute. The turnout of 2,104,000 net tons of ingots and steel for castings would top by 7000 tons the previous high set only last December.

Problem of Sales?

The auto industry may soon face the problem of how to sell cars, instead of how many it will be allowed to produce. So says *Ward's Automotive Reports*, which pre-

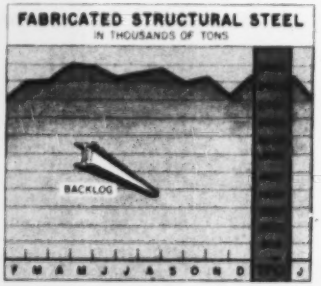


Metalworking Employment

Production Workers—Five Major Groups

	Prim. Mfg.	Fab. Prod.	Machinery	Elec. Mchy.	Trans. Equip.
1951					
Jan.	1,149	847	1,192	711	1,175
Feb.	1,153	852	1,215	716	1,233
Mar.	1,159	858	1,231	724	1,253
Apr.	1,161	859	1,239	718	1,243
May	1,162	850	1,242	707	1,233
June	1,172	843	1,252	704	1,237
July	1,155	813	1,235	684	1,187
Aug.	1,165	816	1,211	695	1,197
Sept.	1,159	811	1,219	709	1,210
Oct.	1,160	809	1,242	707	1,205
Nov.	1,151	804	1,255	717	1,242
Dec.	1,165	807	1,270	724	1,238
1952					
Jan.	1,167	801	1,273	726	1,244

U. S. Bureau of Labor Statistics

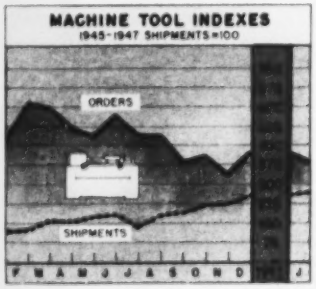


Fabricated Structural Steel

Thousands of Net Tons

	Shipments 1952	Shipments 1951	Backlogs 1952	Backlogs 1951
Jan.	241.3	214.0	2,416	2,404
Feb.		193.6		2,590
Mar.		237.1		2,602
Apr.		234.1		2,808
May		234.5		2,771
June		257.1		2,636
July		204.4		2,688
Aug.		236.9		2,748
Sept.		228.3		2,580
Oct.		239.0		2,641
Nov.		218.2		2,438
Dec.		202.7		2,670
Total		2,465.8		

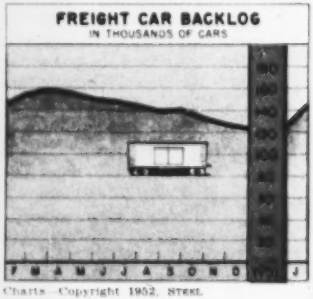
American Institute of Steel Construction



Machine Tool Indexes

	New Orders 1952	New Orders 1951	Shipments 1952	Shipments 1951
Jan.	381.0	475.4	266.3	114.3
Feb.		615.5		123.8
Mar.		590.3		158.9
Apr.		516.1		157.7
May		483.0		175.1
June		558.8		182.8
July		490.6		144.7
Aug.		488.9		178.9
Sept.		380.2		189.8
Oct.		403.9		221.3
Nov.		330.5		226.0
Dec.		416.8		253.9

National Machine Tool Builders' Assn.



Freight Car Awards and Backlogs

	Awards 1952	Awards 1951	Backlogs 1952	Backlogs 1951
Jan.	5,338	26,356	120,251	144,758
Feb.		15,947		154,861
Mar.		11,271		158,619
Apr.		6,628		155,871
May		4,919		150,628
June		6,793		147,725
July		2,417		144,810
Aug.		1,828		139,014
Sept.		9,657		140,135
Oct.		3,464		132,792
Nov.		6,752		129,158
Dec.		3,309		123,947
Total		96,190		

* End of month

American Railway Car Institute

Charts—Copyright 1952, STEEL

Issue Dates of other FACTS and FIGURES Published by STEEL:

Construction	Feb 11	Indus. Production	Feb 18	Refrigerators	Feb 25
Durable Goods	Mar 3	Malleable Castings	Dec 31	Steel Castings	Dec 31
Employ., Steel	Jan 28	Prices	Feb 18	Steel Forgings	Feb 25
Foundry Equip.	Feb 18	Pumps	Mar 3	Steel Shipments	Dec 17
Furnaces, Indus.	Feb 18	Purchasing Power	Mar 3	Vacuum Cleaners	Feb 4
Gear Sales	Feb 11	Radio, TV	Jan 21	Wages, Metalwkg.	Jan 28
Gray Iron Castings	Dec 31	Ranges, Elec.	Feb 25	Washers	Mar 3
Ironers	Jan 21	Ranges, Gas	Feb 25	Water Heaters	Feb 11

dicts that NPA will give the industry a "bonus" of 70,000 cars this month.

January-February passenger car volume reached only 613,000 units, while in the same period last year the millionth car left the U. S. assembly line. Truck production was somewhat better: 204,000 units in the first two months compared with 237,000 in 1951. With steel, zinc and lead supply easing, NPA is now studying manufacturers' statements as to materials needed for a 1.1-million-unit second quarter. Conflicting sales predictions cloud the future. While the industry says demand this year will top production by a wide margin, reports on January sales of autos and parts by car dealers were still below third and fourth quarter, 1951, levels.

For the fifth consecutive week, automakers boosted passenger car output and a new high for the year was racked up in the week ended Mar. 1. *Ward's* figures U.S.-Canadian production at 115,918 cars and trucks, a gain of almost 5000 units from the preceding week.

Fast-Slipping Stocks . . .

Shifts into low gear by motor truck manufacturers may pose shipping problems to industry this year, says the Automobile Manufacturers Association. It points to fast-slipping stocks of new trucks in dealers' hands and production curbs as causes. Motor Vehicles Division of NPA predicts that only 832,000 new trucks will be available for domestic consumers this year. That's 25 per cent below the average 1,117,000 units built for the domestic market in the five preceding years. The agency also reports that retail sales of new motor trucks exceeded production by more than 53,000 units in the last half of 1951.

Search for Capital . . .

Corporate security offerings in 1951 were highest since 1929, reports the Securities & Exchange Commission. New security offerings last year amounted to $7.8 billion, compared with $6.4 billion in 1950 and $7.1 billion in 1948. The increased volume evidences

the search by corporations in the capital market for funds to finance record plant and equipment expenditures.

New securities provided one-fourth of the $6.5 billion that corporations raised in 1951 for new money purposes ($5.1 billion for plant expansion and $1.4 billion for additional working capital). Private transactions accounted for 44 per cent of all corporate issues in 1951. About three-fifths of the debt issues were privately placed.

A continuation of the trend toward equity financing was seen last year; equity issues accounted for 26 per cent of total corporate offerings. Common stock offerings totaled $1.2 billion, largest amount since 1929. Including both public and private offerings, manufacturing firms made up 40 per cent of the $7.8 billion corporate offerings. Refinancing activity skidded sharply: Less than $900 million of securities were offered to refund outstanding debt, bank loans, and to retire preferred stock—a billion dollars less than in 1951.

Where the Money Went . . .

Fixed capital expenditures accounted for almost three-fifths of the $38 billion in new capital requirements of American corporations last year, according to an analysis by the Office of Business Economics. Additions to liquid assets ($3 billion) were about 40 per cent below 1950. Retained earnings fell sharply—from almost $13 billion in 1950 to $7.8 billion in 1951—as taxes advanced more than profits, while dividends were relatively well maintained. Depreciation allowances of $8.5 billion were higher than in 1950, showing the effect of fast write-offs permitted defense-related facilities expansions.

Trends Fore and Aft . . .

Work stoppages in January were 30 per cent above December, says the Labor Department. A total of 600 strikes involved 250,000 workers . . . Industrial construction awards in the week ended Feb. 28 were down to $28.6 million . . . New wholesale price index merges "Metals and Metal Products" classification into group "All Commodities Other Than Farm and Foods" . . . Iron ore stock going into February totaled 30.3 million long tons, a 7-million ton decrease from December . . . Foundry equipment orders in January rose by $800,000 from December, but shipments dropped by $300,000 . . . January output of the gearing industry decreased 6.4 per cent from December volume.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Output (per cent of capacity)[2]	101.0	100.0	100.0
Electric Power Distributed (million kwhr)	7,416	7,461	6,822
Bituminous Coal Output (daily av.—1000 tons)	1,681	1,750	1,681
Petroleum Production (daily av.—1000 bbl)	6,350[1]	6,366	6,016
Construction Volume (ENR—millions)	$165.7	$222.1	$352.1
Automobile, Truck Output (Ward's—units)	115,918	110,542	177,567
TRADE			
Freight Car Loadings (unit—1000 cars)	730[1]	683	786
Business Failures (Dun & Bradstreet, number)	163	177	170
Currency in Circulation (millions)[3]	$28,390	$28,387	$27,198
Dept. Store Sales (changes from year ago)[3]	−12%	−6%	+18%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$14,796	$18,459	$14,204
Federal Gross Debt (billions)	$260.3	$260.1	$256.0
Bond Volume, NYSE (millions)	$11.0	$11.6	$22.5
Stocks Sales, NYSE (thousands of shares)	6,158	6,634	9,773
Loans and Investments (billions)[4]	$73.5	$73.7	$69.2
United States Gov't. Obligations Held (billions)[4]	$32.0	$32.2	$30.9
PRICES			
STEEL's Weighted Finished Steel Price Index[5]	171.92[1]	171.92[1]	171.92
STEEL's Nonferrous Metal Price Index[6]	243.6	243.6	261.9
All Commodities[7]	111.7	111.8	115.0
All Commodities Other Than Farm and Foods[7]	112.7	112.9	116.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1951, 1,999,035; 1952, 2,077,040. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

For Fast Dependable WAREHOUSE SERVICE

Rely on ***VIKING***

- COLD FINISHED BARS—Rounds Hexagons, Flats and Squares
- ALLOY COLD FINISHED BARS
- HOT ROLLED BARS—Rounds Flats and Angles
- STRUCTURALS—Channels Angles and Beams
- HOT ROLLED PLATES
- ABRASION RESISTING PLATE
- HOT ROLLED AND COLD ROLLED SHEETS
- HOT ROLLED STRIP
- YOLOY PRODUCTS—Angles Flats, Plate and Sheets
- DEFORMED REINFORCING BARS
- WELDED WIRE MESH
- SOFT BLACK ANNEALED WIRE
- BRIGHT BASIC WIRE AND WIRE RODS
- WIRE ROPE AND FITTINGS

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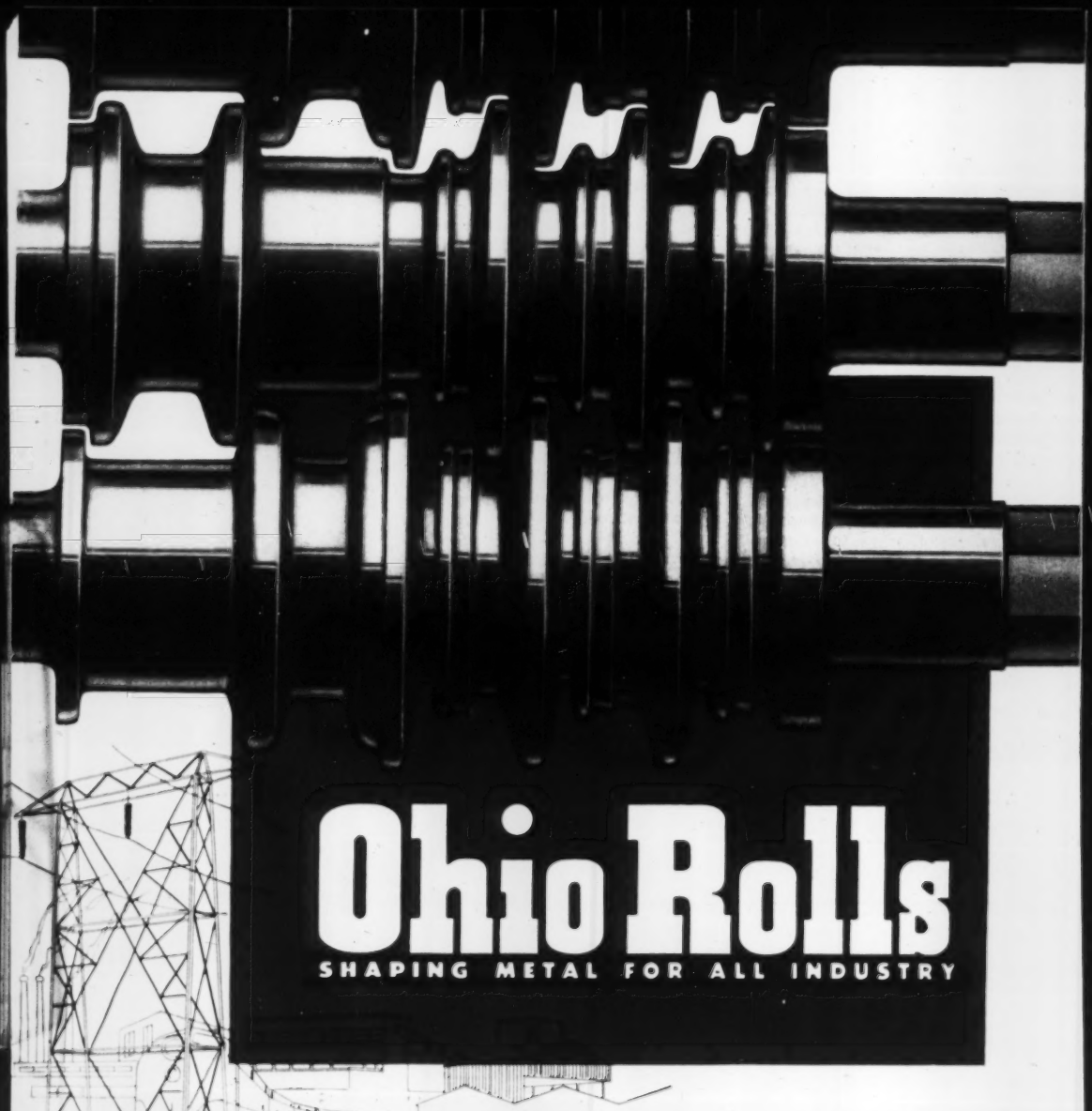

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- Ohioloy "K" Rolls
- Holl-O-Cast Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls
- Flintuff Rolls
- Ohio Double-Pour Rolls

THE OHIO STEEL FOUNDRY CO.

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Men of Industry

JOHN K. BEIDLER
. . . gen. mgr., Dravo machinery div.

NELSON C. DEZENDORF
. . . gen. mgr., GM Electro-Motive Div.

WILLIAM H. WORRILOW JR.
. . . Lebanon Steel gen. sales mgr.

John K. Beidler was named general manager, machinery division, **Dravo Corp.**, Pittsburgh. He also became a director and a vice president of Dravo-Doyle Co., a subsidiary. In assuming the general managership of the machinery division, Mr. Beidler fills a vacancy created by the death of **Walter P. Berg.**

Vickers Inc., Detroit, promoted **Edward J. Doucet Jr.** to the position of advertising manager.

Kaiser Steel Corp., Fontana, Calif., appointed **Kenneth Casey** superintendent of roll shop to replace the late **Anton B. Frost. C. F. Benninghoff** becomes assistant superintendent of coke ovens and by-products.

Harry E. Byerrum was appointed sales manager, **Baker Steel & Tube Co.**, Los Angeles.

W. T. Ingram was appointed general sales manager, Pacific Coast region, **Reynolds Metals Co.**, Louisville. He was general manager-executive sales at Louisville.

John M. Phillips Jr., formerly vice president-general manager, **Phillips Mine & Mill Supply Co.**, Pittsburgh, was elected president to succeed **John M. Phillips Sr.**, who was advanced to chairman of the board. **James M. Phillips** becomes the new vice president and general manager. **D. A. Beck** also was named a vice president, and will direct purchases and serve as assistant secretary-treasurer.

Nelson C. Dezendorf was appointed general manager, Electro-Motive Division, La Grange, Ill., **General Motors Corp.** Since 1945 director of sales, he succeeds the late **B. A. Dollens. Albert F. Davis,** administrative engineer, Detroit Diesel Engine Division, was appointed works manager to succeed **George A. Zink,** named assistant general manager, Fabricast Division at Bedford, Ind.

Charles J. Pecoy was appointed sales manager, **Body Bros. Inc.**, Bedford, O.

Phil Sprague Jr. was appointed executive vice president, **Hays Corp.**, Michigan City, Ind. **Paul B. LeBoeuf** succeeds Mr. Sprague as advertising manager. He was with A. O. Smith Corp., water heater division, Kankakee, Ill., in charge of advertising and sales promotion.

Walter H. Stocking, for several years assistant to the president, **Pittsburgh Forgings Co.**, Coraopolis, Pa., was elected vice president. **John C. Bane Jr.**, secretary, was also made a vice president, retaining his former position. **Edward H. Eaton,** comptroller, also becomes assistant treasurer.

Evan J. Parker, president of **American Hardware Corp.**, New Britain, Conn., announces retirement of **Joseph C. Andrews,** vice president in charge of purchasing. **Eugene D. Emigh Jr.** was appointed purchasing agent to succeed Mr. Andrews.

William H. Worrilow Jr. was appointed general sales manager, **Lebanon Steel Foundry,** Lebanon, Pa. He was assistant general sales manager of the company, of which he also is a director. **Robert C. McConnell** assumes the newly created position of director of industrial relations.

P. M. Cobb, formerly vice president-sales, San Francisco district, was promoted to vice president-sales, **Consolidated Western Steel Division,** U. S. Steel Co. **Ralph W. Seely,** vice president at the Maywood, Calif., plant, becomes vice president and assistant to **Alden G. Roach,** president, with division-wide responsibilities for engineering, estimating, and industrial relations.

Francis A. Bade Jr. was appointed plant engineer of **American Radiator & Standard Sanitary Corp.'s** Bond plant in Buffalo.

Mississippi Valley Structural Steel Co., Chicago, elected **E. T. Blix** to the newly created position of executive vice president. He will be in charge of sales and operations for company plants. Mr. Blix was vice president-manager, Melrose Park, Ill., plant. **John C. Arntzen** was appointed manager of the Melrose Park plant.

Martin E. Gilwood was named director of research, **Permutit Co.**, New York.

William J. Doyle was elected vice president-sales, **Astatic Corp.**, Con-

neaut, O. He formerly was sales manager.

John Searle was named chief spring engineer in the automotive division of **Detroit Steel Products**

JOHN SEARLE
. . . new post at Detroit Steel Products

Co., Detroit. He has been with the company since 1926.

Richard C. Lawson was appointed assistant manager, railroad and spring sales department, **Crucible Steel Co. of America**, with headquarters in New York.

Claude N. Monson was elected a vice president and manager, AiResearch Mfg. Co., Los Angeles, a division of **Garrett Corp. Charles T. Leigh** was named to the board of Garrett to succeed **J. G. Hormel**, resigned for reasons of health. Mr. Monson, manager of AiResearch, was also treasurer of Garret. **W. D. Morgan**, vice president-research, was elected treasurer. He will be aided by **T. G. Hawkins**, named assistant treasurer.

Sunbeam Corp., Chicago, elected **R. P. Gwinn** vice president-general sales manager, electric appliance division, and a director. Other vice presidents elected are: **P. J. Musolf**, factory manager; **C. J. Uhler**, labor relations; **A. E. Widdifield**, advertising; **Ivar Jepson**, development and research; and **L. W. Prestin**, industrial furnace division.

Mosher Steel Co., Dallas, appointed **H. W. Beutel** production manager of all its plants. He was works manager at Dallas. **Payson B. Clarke** of the Houston office becomes sales manager of the Dallas office and North Texas territory. **W. S. Mosher Jr.**, assistant secretary-treasurer, was made building and office manager at Dallas, and **M. W. Wade** will be in charge of purchasing and traffic in Dallas, assisted by **W. T. Milliken.**

Ekco Products Co., Chicago, named **Robert W. Reinicke** assistant vice president-manufacturing and engineering. Before joining Ekco he was general factory manager, Waterbury Mfg. Co.

A. H. Knief was appointed regional manager, **Davey Compressor Co.**, with headquarters in Milwaukee.

D. D. Spoor was appointed manager, equipment and process sales department, **Air Reduction Sales Co.**, division of Air Reduction Co. Inc., New York.

Alwin F. Franz was elected president, **Colorado Fuel & Iron Corp.**,

ALWIN F. FRANZ
. . . new president of C.F.&I.

New York, and **Carl W. Meyers**, president since 1946, becomes vice chairman of the board of directors. Mr. Franz has been executive vice president since 1949 and a director since 1948.

Arthur Templeton was appointed southwestern divisional sales engineer for **Templeton, Kenly & Co.**, Chicago. His headquarters will be at Dallas.

John C. Helies was appointed general manager of the newly established appliance control department, **General Electric Co.**, headquarters for which will be at the Morrison, Ill., plant. **W. A. Raines** was named assistant manager, industrial department, New York district, apparatus sales division. He succeeds the late **L. F. Rodewig**, and is succeeded as head of the general sales section by **H. T. Todd. W. E. Graham** was named to head the section on machinery manufacturer sales. **William W. Trench**, secretary of General Electric for almost 24 years, has retired after a total of 37 years of service.

G. A. Gade, manager of outside sales for **Standard Pressed Steel Co.**, has transferred his headquarters from Detroit to the SPS plant in Jenkintown, Pa.

Raymond S. Wood was appointed general manager of **Link-Belt Co.'s** ball and roller bearing plant (Dodge plant) in Indianapolis. He succeeds **C. V. Loughery**, retired.

Kaiser Aluminum & Chemical Sales Inc. appointed **R. F. Tighe** product manager in the Chicago general sales office for pig and ingot to succeed **J. M. Welch**, recently named Chicago district sales manager. Mr. Welch succeeds **Gordon C. Anderson**, who recently left the organization.

R. W. Dalzell, manager-commercial research, **Lukens Steel Co.**, Coatesville, Pa., was promoted to assistant manager of market development.

Harry J. Wines was appointed sales promotion manager, **Bryant Heater Division**, Affiliated Gas Equipment Inc., Cleveland. He was with General Electric Co. where he managed distribution sales of its cooling and heating products.

Orrin W. Barker, assistant chief engineer, was named chief engineer at **Kearney & Trecker Corp.**,

ORRIN W. BARKER
Kearney & Trecker chief engineer

You're sighting on the moose through a Weaver Scope made by W. R. Weaver Company, El Paso, Texas

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Hitting specification bull's-eyes to help our customers hit their production targets is a Superior specialty.

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J. L. WHITTEN
adds to duties at Lee Wilson Eng.

V. L. MILLER
. . . chief engineer at Lee Wilson Eng.

W. R. WATT
. . . additional post at Lee Wilson Eng.

Milwaukee, where he has been continuously employed since 1925.

J. L. Whitten, vice president and sales manager, assumed the additional duties of general manager of **Lee Wilson Engineering Co. Inc.,** Cleveland. He has been with the company 14 years. **V. L. Miller,** associated with the company for six years, and previously in charge of research and development, is now chief engineer. He succeeds **H. H. Armstrong,** resigned. **W. R. Watt,** for the last year assistant to the president, has also been made production manager.

Peter V. Martin, recently returned from India where he represented **Koppers Co. Inc.,** was appointed a vice president in its engineering and construction division, and on Mar. 15 leaves for Santiago, Chile, where he will be Koppers representative on the board of directors of Pacific Steel Co. of Chile.

William J. Borth was appointed to special assignments, reporting directly to R. R. Rausch, vice president and executive assistant to the president of Willys-Overland Motors Inc., Toledo, O.

Robert M. Fichter was appointed sales promotion manager, consumer products, a new post at **Westinghouse Electric Corp.'s** consumer products division, Pittsburgh.

Paul Byrd was appointed district manager of the Massillon, O., territory, Reliance Division, **Eaton Mfg. Co.**

George C. Floyd was elected a director, **Vanadium Corp. of America,** New York. Prior to joining Vanadium last January, he had been a vice president, Thomas Steel Co. **Patrick J. Gibbons** retired as executive vice president and director of the company, but remains as consultant to the president.

James M. Walton was appointed plant industrial engineer at the **Midland Works,** Midland, Pa., Crucible Steel Co. of America.

Otto G. Schwenk was named vice president in charge of industrial products, **Blaw-Knox Co.,** Pittsburgh. He was vice president-production at Yale & Towne.

John E. Cinkosky was appointed eastern zone manager, **Mercury Clutch Division,** Automatic Steel Products Inc., Canton, O. He formerly was vice president-sales, Centric Clutch Co.

A. R. Kemp joined **Narmco Inc.** He will be in charge of research on new products in the Costa Mesa and San Diego, Calif., plants.

OBITUARIES . . .

John C. Myers Sr., 73, board chairman, **F. E. Myers & Bro. Co.,** Ashland, O., died Mar. 1. Until December he had been president of the company.

B. L. Rand, 96, founder of **Rand Co.,** forerunner of Remington Rand Inc., died Feb. 27 at his home in North Tonawanda, N. Y.

Jacob Betz, chairman of the board and treasurer, **Mollenberg-Betz Machine Co.,** Buffalo, died Feb 27. He organized the firm in 1910 with the late H. J. Mollenberg.

Clarence M. Strong, 53, director of purchases, **Gar Wood Industries,** Wayne, Mich., died Feb. 23.

Victor Hage, 64, president, **Weishaupt Iron & Wire Works,** Chicago, died Feb. 25.

Selden G. Warner, 67, president, **Staset Co.,** West Orange, N. J., died Feb. 27.

Seth A. Combs, one of the founders of **C-M Mfg. & Machine Co.,** Bloomfield, N. J., and chairman of the board, died Feb. 26.

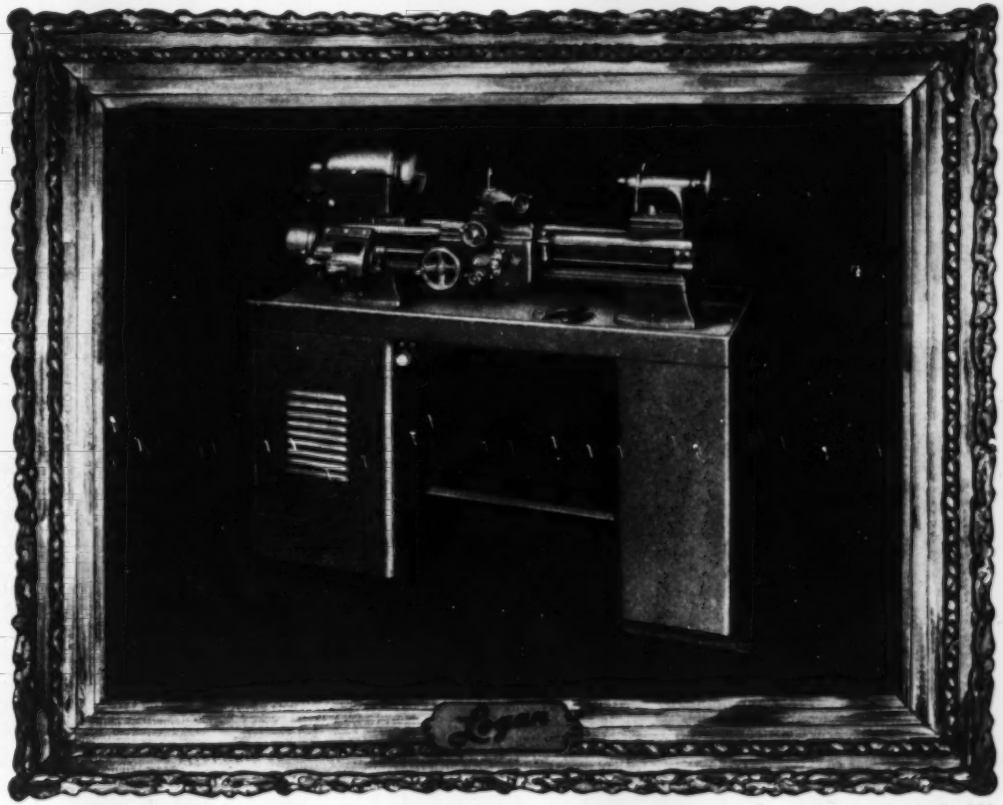
Heyman Rosenberg, 78, inventor of the self-tapping screw, and founder in 1913 of **Parker-Kalon Corp.,** New York, screw manufacturing concern, died recently. Until his death he was a director of the firm.

Paul Ravell, 52, assistant to the president, **Norwalk Co.,** Norwalk, Conn., died Feb. 26.

Marcus W. Morey, 64, who last September completed a half century with **J. M. & L. A. Osborn Co.** and its successor, **Inland Steel Products,** Cleveland, died Feb. 28.

Frank McDonnell, 66, a vice president, Hughes Tool Co., Houston, died Mar. 1.

N. L. Wright, 55, treasurer, **Connecticut Valley Mfg. Co.,** Centerbrook, Conn., died Feb. 27.



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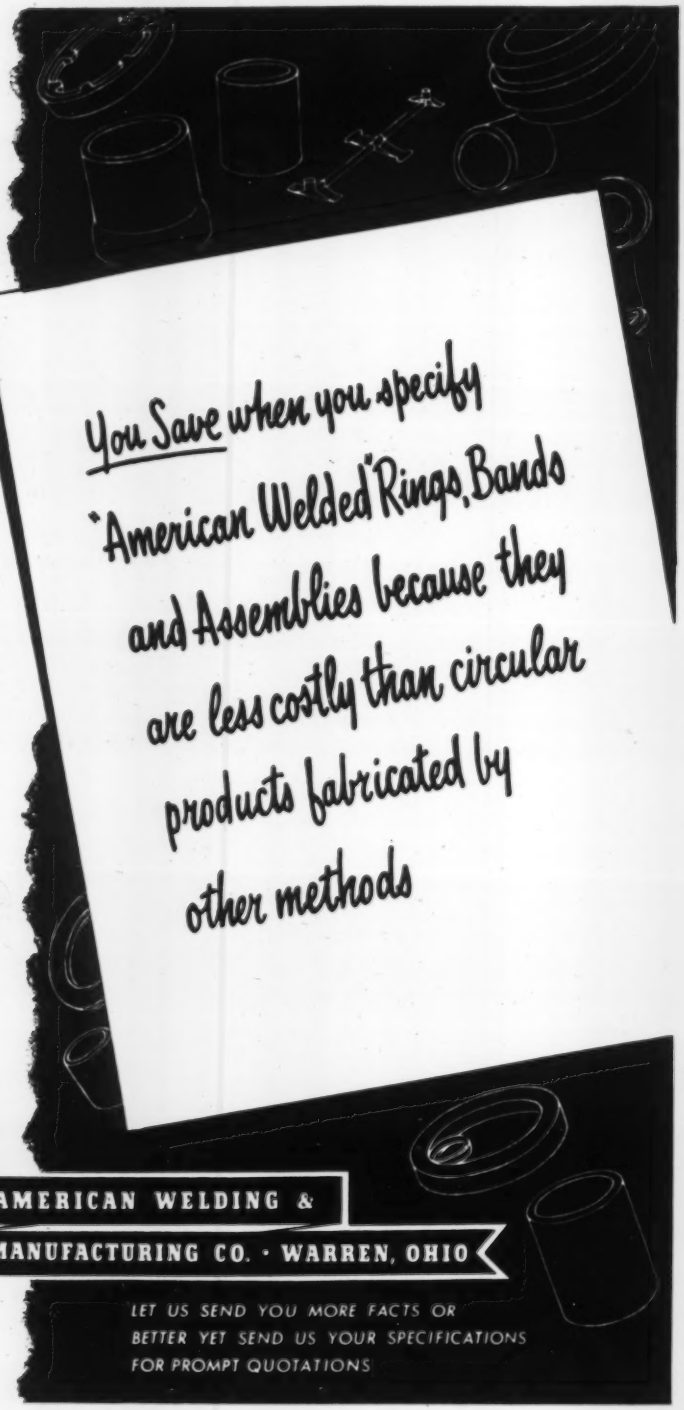

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Production AND Engineering
NEWS AT A GLANCE

MAN IN THE MIDDLE—Today's tool engineer is a sort of mental jack-of-all-trades and specialist at many, responsible for planning and equipping processes required in manufacturing. That involves designing or adapting machines, tools, gages, dies, jigs, fixtures; plant layout, time and motion studies, quality control; liaison with sales, research and executive branches of a business. p. 106

SUPERSONIC SOLDERING—In soldering aluminum, size of parts to be joined is the limiting factor. High thermal conductivity of aluminum (almost three times that of iron) poses the problem. Small parts can be brought up to soldering temperature (about 550-700°F) and held there while making the joint. But parts over 20 square inches are not easily handled. One method that appears to offer possibilities consists of vibrating the work at supersonic frequencies while making the joint. This breaks up and helps remove the oxide film. Power output of present equipment is sufficient for only small parts. Development of more powerful supersonic soldering devices may extend and eventually overcome present size limitations.

COPPER SAVER—Plastic piping will be installed in new Navy minesweepers, saving about 2 tons of copper per ship. Cost of the plastic pipe in 2-inch size is about 70 cents per foot. In an 8-month test aboard a destroyer escort, plastic pipe held up under severe corrosion, shock and vibration conditions. Pipe is fiber glass cloth bonded with synthetic resin. It can be patched with fiber glass tape impregnated with plastic.

NO LOST MOTION—The lowly pallet occupies a position of prime importance in the machining of tank transmission cases and carriers at GM's Chevrolet-Cleveland Division. The heavy 170 and 195-pound armor plate parts are palletized through the entire processing. Each of the components rides on three pallets designed by plant engineers and built in the division's tool room. Roller conveyors link machines at a standard height so work can be moved from machine to machine without lifting. p. 114

SAVINGS BY THE POUND—Sixty million pounds of copper and aluminum—that's what engineering ingenuity saved the automotive industry last year. Continued conservation efforts in 1952 are expected to yield additional savings of at least 31 million pounds. The industry in 1951 used about 90 million pounds less copper and aluminum than it did in 1950 as a result of production cutbacks. Enough copper has been saved to build 7 million new automobiles and enough aluminum for 6 million. Every day, one company alone saves 22,400 pounds of aluminum, 32,900 pounds of copper, 12,700 pounds of nickel, 43,600 pounds of zinc, 2620 pounds of tin and 1020 pounds of cadmium.

CUTTING MECHANICS—What's the explanation for variations in chip geometry, tool forces, tool build-up and surface finish brought about by an increase in cutting speed or feed of a metal cutting tool? One theory holds that local temperature in the chip plays an important part in affecting friction at the chip tool interface. For many purposes, effects due to speed and feed can be regarded as functions of the product of speed and feed. Temperature does not directly affect shear strength of the metal. The extent of built-up edge prevailing can be put as a function of the product of speed and feed.

CURRENT EVENT—A London scientist detects tooth decay by attaching to the suspected tooth a platinum wire linked to a 10-v battery and a current measuring instrument. Another wire to the patient's cheek completes the circuit. If the tooth is sound no current passes through it because solid tooth enamel is a poor conductor of electricity. But if there's a cavity! . . .

POWER IN A PACKAGE—Even rolling mills are packaged as units now. It is possible to purchase a small, single-stand mill to roll metal to meet particular requirements using standard available sheet or strip. Power supply for such a mill, Westinghouse points out, comes packaged too. In a single metal cabinet 6-1/3 x 8-1/3 x 3-1/3 feet, is a 75 hp motor-generator set to supply power to the main and reel motors, a small booster m-g set to provide IR-drop compensation for the reel motor and to improve regulation and all the control apparatus. A selenium rectifier supplies excitation, eliminating one rotating machine.

VERSATILITY HARNESSED—Metalworking's goal in a garrison state is more production with less scrap. Chances of reaching that goal are enhanced by eliminating the human element when skilled help is not available. That's where smart tooling can make the difference. Machine tool manufacturers, tool builders and users every day are coming up with effective answers to tooling problems. An electronic caliper designed for use with an elecronic amplifier is one example. The unit makes possible precision gaging of work in units varying from 0.0001 to 0.00001-inch. The workpiece can be on the bench, in the fixture or in the machine. p. 108

Metalworking Outlook—p. 69 *Market Outlook—p. 211*

Tool Engineer . . . *His Imagination Pays Off*

Planning and equipping processes for manufacturing demands lengthy training and wide knowledge of materials, methods, machines and human relations

By ARTHUR H. ALLEN
Technical-Business Consultant, Cleveland

SPECIAL skills involved in planning production processes have been and continue to be in the greatest demand ever known, as the result of a dual effort to mount an enormous program for output of ordnance, aircraft and other military equipment, at the same time keeping running in high gear a civilian economy which has never been equaled.

Who are these production planners, these specialists in laying out processing equipment? Once they were called simply master mechanics or process engineers. In the past 20 years, however, the new profession of tool engineering has come into the picture. It is probably new in name only, since the many functions of tool engineers have been performed as long as manufacturing itself has existed. By definition, tool engineering is "the technique of planning and equipping the processes required for manufacturing."

Mental Blacksmith—That covers a lot of territory—preparing the basic material or component for processing; designing machines, tools, gages, dies, jigs, fixtures; plant layout; time and motion studies; quality control; maintenance of facilities; even such things as safety engineering and liaison activities with sales, research and executive branches of a business. Obviously to be expert at all these tasks would require a mental jack-of-all-trades of prodigious ability. In a sense that is what the tool engineer is—a jack-of-all-trades or a sort of mental blacksmith who can pick up a part and visualize a complete setup for manufacturing it in quantity and to precise dimensional tolerances.

Naturally this calls for keeping thoroughly and promptly posted on all latest developments in materials, methods and machines. Particularly in these days of shortages in critical materials and of the need for every ounce of effort in the direction of material conservation is there a premium on such knowledge. How to save on use of copper? What to use in place of nickel? Where to specify boron steels? The tool engineer must know—or at least know where to turn to find such data.

Tooling Short Cuts—New advances in machining methods point to important possible savings, both in time and cost. What about hot machining? What about new coolants and jet spray methods for their application? How to machine some of the complicated sections used in turbojet engines? These are just a mere sampling from the multitude of new processing ideas which the tool engineer must tackle, in the hope of translating them into more pounds of metal removed per hour.

If jet engine builders are to achieve a production goal of 18,000 units a month there must be many improvements and shortcuts made in setting up tooling for the operation. Such an output means, for example, the processing of 36 million compressor blades alone, to say nothing of the necessary turbine buckets, wheels, diaphragms, burner cans and the dozens of other odd-sounding jet components.

Not Enough to Go Around—How many tool engineers are there? Well, for one thing, not enough. A look at the help-wanted classified advertising section of any metropolitan daily proves that. The defense production effort under way for the past 20 months has been concentrated almost entirely on the tooling phase and this has thrown excessive demand on the services of engineering talent capable of doing the necessary planning, equipment selection and layout which must precede actual production.

The American Society of Tool Engineers, now entering its third decade of existence, has enrolled about 20,000 members, rather a remarkable achievement in this short period of time as technical societies go. Some of its leaders figure this membership may represent possibly 10 per cent of the total number of engineers in the country who might come under the classifications of tool engineers. They obviously constitute a fairly cosmopolitan assortment of technical experts, as, in fact, does the ASTE itself. They range all the way from draftsmen and apprentice engineers up to top industrial executives. The latter group, incidentally, in the ASTE includes about 5000, a special effort having been made to sell corporation executives who came up through tool engineering work on the values of a new technical society devoted to their profession.

Essential character of the tool engineer's contributions to industry planning has resulted in strenuous appeals for their deferment where selective service has attempted to pick them out of jobs. It takes a minimum of five years of apprentice training, drafting and shop work to bring a capable young engineer to the point where he is qualified for active participation in tooling programs and his loss to the military is felt keenly.

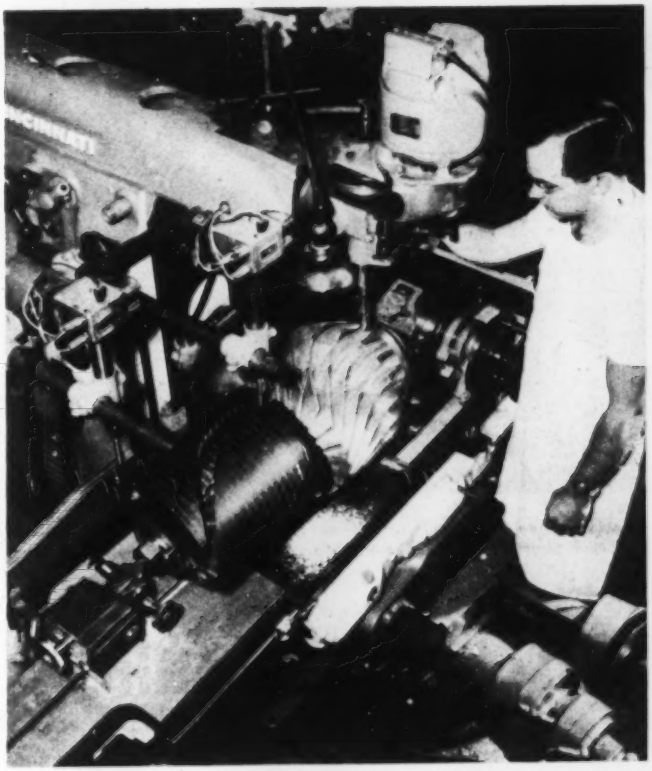
Automaticity a Must—Basic to all forms of production in the met-

in Production

alworking field is the machine tool and the huge expansion which has taken place in this industry alone, plus the extended amount of subcontract work which it has entailed, have combined to make even more critical the need for experienced process engineers. The hump may be over by now but for a considerable period it was touch and go with many companies as to whether they could possibly handle the greatly increased engineering load. Helping in the situation was the extension of the timetable for defense production, not to forget also the willingness with which independent engineering organizations and services undertook defense tooling assignments.

Most process planning, particularly in the mass production industries, has been moving in the direction of automatic operation, not only in the functions of a single machine, such as clamping, traversing of tools, etc., but also in the movement of the part into and out of the machine. Automation devices, pioneered by the automotive industry, have been perfected for installation on many types of machine tools, eliminating the need for manual effort, insuring better precision and greater hourly production. They are, of course, a form of material handling equipment and their integration with conveyors and machine motions has been effectively accomplished by co-operation between tool engineers and materials handling specialists.

Another new field in which tool engineers have had to become proficient, or at least conversant with developments, is electronics. Application of electronic controls to machines and other operating mechanisms has been a major reason for important cost reductions in processing. Electronic devices are not the easiest thing in the world to understand, or to design, install and service. However, their ability to translate feeble electric currents into the precise control of powered mechanisms has provided an efficient new system for the process engineer.

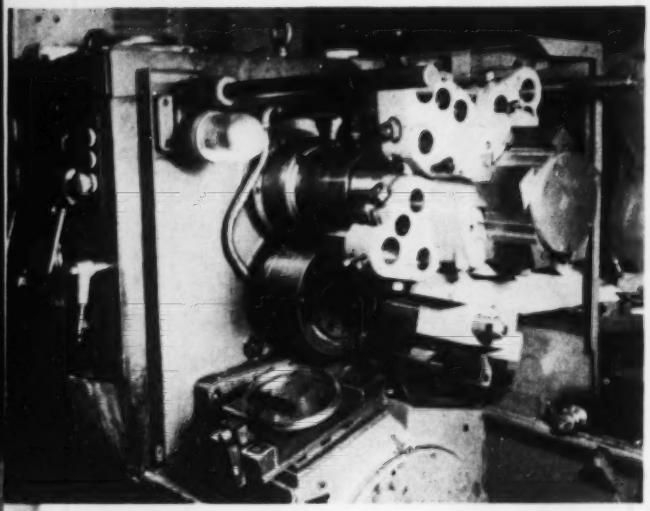


Horizontal milling machine and Bridgeport head with four duplicator control motions, two are used at NACA's Lewis Flight Propulsion Laboratory

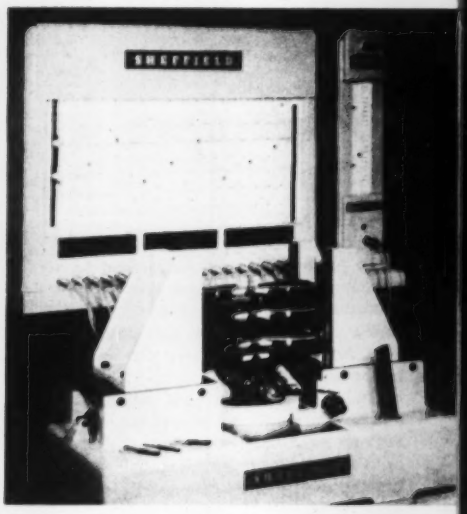
New Quality Control Tools — Precision in metalworking has been given a major stimulus by advances in gaging and inspection methods, and by corollary achievements in quality control, especially statistical quality control. Here again the process engineer has discovered important new tools at his disposal, tools which required considerable study and analysis before their production status could be appreciated.

Not the least of the tool engineer's tasks has been that of understanding the workman himself —his attitudes, his reactions, his co-operation. A new method or process or machine, while it may have certain inherent design advantages, is of little value if the man who is to operate it cannot or will not make use of them. The designer must have a familiarity with some of the basic phases of labor relations or perhaps more accurately human relations.

So, we find that in two brief decades, marked by post-depression industrial recovery, all-out war production, postwar expansion and finally renewed gearing of industry's wheels for military production, the tool engineer has grown accordingly in professional stature, backed by a youthful and aggressive technical society whose extension seems to have no limits. Possibly the increasing recognition being accorded the process engineer and others of his breed forecasts the day when all engineers will have reached the level of earning power, respect and attainment which at times has seemed somewhat below realistic expectations.



Angular fixture developed by Warner & Swasey for producing propeller assembly ring. Concentricity and no distortion are musts



Sheffield jet engine blade contour gage analyzes contour, thickness, lean, tilt, warp and centrality

TOOLING: Versatility Harnessed to a

Getting more production per man-hour per machine requires imaginative tooling. The problem is complicated by obsolete machinery, tough materials and a skilled help shortage

MORE production with less scrap is metalworking's goal in the combined defense and civilian production economy. But the road to attaining this goal is studded with land mines. Materials are tougher, tolerances are closer and skilled help is at a premium.

Elimination of the human element wherever possible is the best solution for the skilled help shortage and it's a problem that depends on the tool engineer to a large degree. Working tougher metals to closer tolerances on machines of obsolete design is another problem for him at the present time. Tell Berna, general manager of the National Machine Tool Builders' Association, says the tool engineer must cushion the shock by getting the most out of these "clunkers" until a year or two from now when new machines become available in adequate numbers and the back numbers can be torn out and replaced.

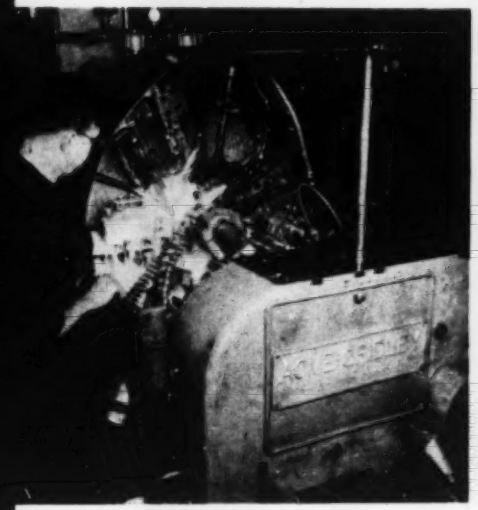
No Easy Solution — "Maximum productivity does not just mean speeding up production rates by installing even better machine tools," says Harry E. Conrad, executive secretary of the American Society of Tool Engineers. "For one thing machine tools are in short supply and if better ones were the only solution to the problem, we would have to defer the solution to a later date. This we can't afford to do."

An unskilled operator can produce scrap at a prodigious rate on modern machine tools, Mr. Conrad points out, a result completely out of phase with the goal of more acceptable pieces per man-hour. Applying adequate precision control methods and equipment is one sure way to reduce the production of scrap pieces.

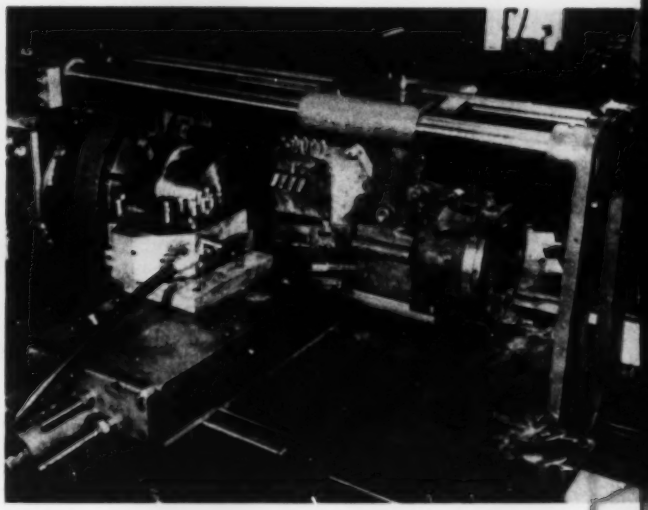
Emphasizing the importance of precision control methods ASTE will devote an entire hall to inspection, quality control and related types of equipment at its 1952 industrial exposition. About 40 suppliers will be represented and an exhibit by a large mass producer will show many of these devices in operation. Opening day of the exposition is designated Precision Control Day and technical sessions will be devoted to dealing with precision control.

First Team—Metalworking production executives concede that precision controls are entitled to equal billing with the tools and machinery needed to produce the parts. Special devices like the air and electrolimit gages for 100 per cent inspection have come a long way since they appeared in metalworking plants a few years ago. The latest developments and refinements in the old standbys are included in the exposition, giving tool engineers a bird's eye view of the precision control picture.

Brown & Sharpe, for example, is featuring an electronic caliper for



National Acme's model M making collet blanks. Side toolslides needn't withdraw to index turret



Loading arbor developed by Gisholt for diesel engine manufacturer. Without the arbor setup loading would have exceeded machining time

Machine

use with its electronic amplifier that makes possible the precision gaging of work in units varying from 0.0001 to 0.00001-inch. Workpiece can be on the bench, in the fixture or in the machine. Taft-Peirce Mfg. Co.'s display features special air gage applications including an air-electric device which will be fed continuously and will translate product dimensions into flashing lights.

Jet turbine manufacture not only poses problems in machining but in gaging as well. Contour, thickness, tilt and angle of jet turbine blades can be checked at 18 to 26 or more points simultaneously with a special gage developed by Sheffield Corp. Each gage takes the place of 11 conventional type gages, thus releasing as many as 20 men on a two shift per day basis for other work.

Optical comparators and contour projectors are undergoing improvements to make them more effective in working on inspection jobs where precision is commonplace. Bausch & Lomb, American Optical, Eastman Kodak, Portman, Jones & Lamson and Universal Engraving & Colorplate's Engineering Specialties Division provide a wide variety of inspection devices for civilian and defense work.

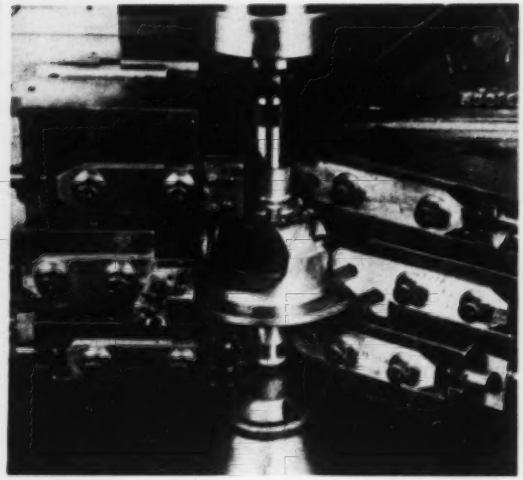
Greater automaticity is metalworking's constant goal. Although today's performance would have been considered the zenith in attainment a few years ago it's only a point on today's production horizon. As a general rule the machine tool buyer consults with the manufacturer on tooling to get higher production. Except on general purpose machinery, tooling by the machine tool builder may add as much as one-third to the final sales price.

Right the First Time—Presetting of tools on production runs to produce the first piece to specified limits is a universal goal. Formerly a new tool was put in a machine at an approximate setting and a piece made. Then the piece was checked and adjustments made. Sometimes it took several tries to get the right setting. In a multiple spindle setup where tools dulled quickly on certain operations it could mean a high scrap rate and considerable time lost in a day's work.

With the presetting method, the operator has a tool holder on the bench set in a gage, puts the new tool in the holder and sets it to the gage. When he replaces the worn out tool with the preset one he knows the first piece will be right on the button. This system enjoys wide usage with transfer type equipment in automotive plants. The only time lost is that required to change the tool. Trial cuts are out.

Guesswork Out—Companion to tool presetting is the proper grinding of tools. Interchanging cutter tools or drills requires precisely the same cutting edge and not one that looks the same to the craftsman's eye. Makeshift tool and drill grinding are out for most automatic operations. A properly sharpened tool not only does the same job as its predecessor but stays sharp longer, reducing machine down time.

Tooling of second operations on the first operation machine is another method of saving time and money in multiple spindle checking and screw machines. For example in making a piece requiring a cross drill hole the part used to be blanked out on a multiple spindle automatic, then go to a drill press. This job now is tooled up entirely on the screw machine. Spindle is stopped in one position and the hole is drilled. Possibilities are immense as was demon-



Malleable iron differential cases are machined at rate of 180 per hour in Bullard Contin-U-Matic. Tools are shown at end of simultaneous cut on several surfaces

Fixtures developed by Cross for presetting tools on bench. Bar fixture sets drills within 1/64-inch. Flush pin fixture sets spotfacers within 0.005-inch

strated in a job where a small induction hardening unit was included in the setup so that a piece was made, hardened and quenched all in the machine.

Saves a Machine—A small part requiring a screw driver slot cut across the head is illustrated as handled in a model 60 New Britain multiple spindle automatic. Normally this job would have been blanked out on a screw machine, then transferred to a small milling machine for the slotting. On this job a wheel is mounted on the main tool slide, moves in and out with the slide and takes the pieces from the No. 6 or cutoff position. Wheel indexes clockwise toward the small saw which is partially covered by the guard. As the wheel indexes by the saw, a slot is put in the top of the screw. An air jet forces the part out of the small pickoff bushing into a chute as the wheel indexes down into the lower position.

Single spindle tooling also permits a wide range of operations. National Acme's model M with its five-sided end working turret, two forming tool slides and a cutoff tool slide set up on a gear blank requiring deep forming, produces blanks to close limits at a rate ten times faster than they were being made. Since this is done on a single machine not requiring secondary operations, the advantages are obvious. Tooling applied to these machines includes recessing, threading, form turning and similar combination equipment.

To take advantage of higher speeds, machine tools are more rigid as are work holding fixtures. Lapointe Machine Tool Co. reports it is developing tools to broach various metals in the jet engine field such as titanium, Nimonic and others. Machines made by the company use speeds as high as 150 fpm, seemingly the top speed possible for the present. The reason is that carbide is the only tooling that works satisfactorily at such speeds and it can only be used on cast iron. This speed is faster than the operator can load the machine, pointing up the necessity for more efficient automatic loading.

Fatigue Reduced—An obstacle to mass production and quality workmanship is operator fatigue. On multiple operation machines this problem is licked by automatic loading and clamping of parts as well as by power indexing of fixtures. The same ideas can be applied to other metalworking operations using more or less standard machines. Quick acting holding and locating devices can be simple in construction but pay for the cost of design and fabrication in relatively short production runs.

Snyder Tool & Engineering's balance milling equipment for connecting rods is typical of machine evolution. Original machine required weighing the connecting rod on a scale to show the overweight of each end. The reading was transferred to fan shaped dials on both ends of the machine using either chalk or a clip. Quills carrying the cutter spindles were then moved in manually until dial indicators moving with the quills contacted the ends of the part and zeroed.

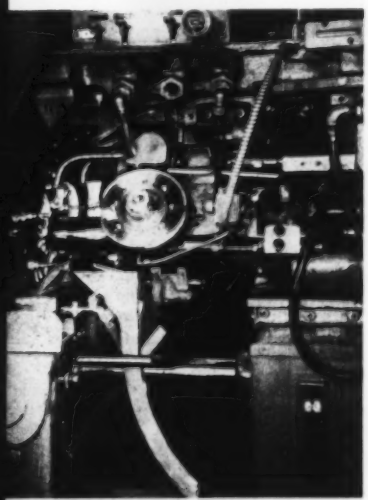
This meant both the cutters were in line with the part and further movement of the quills would result in stock removal. Quills were moved forward to the previously marked position, cycle button depressed and rod was sent up between the two cutters for milling to correct weight. Machine was rated at 60 rods per hour at 80 per cent efficiency.

Second machine in the series still clamped the parts manually but spindles were heavier and there was more room for the fixture making it easier to load and unload. Electrical fingers replace

the dial indicators for positioning the cutters in line with the part.

Fully automatic operations with hydraulic clamping and electronic positioning of spindles requiring the operator only to load, unload and press the cycle button are features of the third machine in this series. Rod is loaded on a fixture suspended from weighing scales, start button is pressed and the automatic cycle begins. Fixture automatically unclamps permitting the operator to unload. Rating of the machine is 144 parts per hour at 80 per cent efficiency. A fourth machine permits weighing and transmitting the overweight information to the cutters while a previously weighed rod is being milled, eliminating this delay from the machine cycle.

For Tight Spot—Special holding devices aren't limited to special purpose machines. Jobs like the one illustrated on a Warner & Swasey 1-AC are solved regularly by machine builders' tool engineers. The propeller assembly ring is made from a tough, stringy AMS-6415 steel and the job required close concentricities with no distortion. Space was the important factor which meant that conventional type finger fixture couldn't be used. The angular fixture developed requires less diametrical space. Fingers holding the workpiece against the rotating surface of the fixture are actuated by a flat circular plate that pulls the fingers down and in during the backward travel.



Screwdriver slot is put in on New Britain multiple spindle machine by small saw partially covered by guard

Carbide cutting tools are finding additional uses although they are not a signed blank check for successful machining. G. A. Gray Co. reports it is using carbides to rough plane the large components for planers, milling machines and horizontal boring machines. Heavy, interrupted cuts are commonplace and feeds utilized are substantially the same as though slower conventional tools were employed. The company says it has never advocated trading speed for feed, costs may be pared only by taking heavy cuts at high speed.

Carbide slug type tools give longer tool life on the tougher materials being used today and the higher speeds and feeds needed to obtain high production, says Bullard Co. "Very superior to previous types of tools" is the company's appraisal, based on numerous experiments. Either square or round slugs are recommended and final selection is based on customer preference. To minimize spoilage it is highly important that tool holders or blocks be rigidly supported or mounted. Experience on any particular job determines a definite time for changing of tool bits. Periodic inspection of the tools and the work quickly determines the beginning of dimensional change so that with modern tooling and good shop management spoilage is minimized.

Grinding Gains—Precision and high production are realized in grinding as much as they are in other machining forms. Recent Heald Machine Co. installations use up to 12 or more individual centerless type machines operated from a single hydraulic and coolant system. In such installations it is usually necessary to have only one or two operators to handle the whole setup. Loading, unloading and machine operation are fully automatic. Another job recently set up by the company uses a Gage-Matic internal grinder equipped with two spindles for bore and face grinding distributor wheels simultaneously. Bore size tolerance is held to 0.0007-inch and production of finished parts is stepped up by combining the two finishing operations.

Tolerances worthy of a gage manufacturer are delivered by a Jones & Lamson dual wheel automatic vertical slide form grinder that grinds jet bucket fir tree roots on both sides at once. Ground with wheels that must be diamond trued for necessary accuracy, these tiny surfaces (about $\frac{1}{8}$ x 2 inches) must successfully withstand terrific centrifugal pressure.

Confidence and Co-operation—Automatic equipment offers some outstanding examples of making good tooling pay handsome dividends. It isn't necessary for the tooling to be unconventional. More often economies result from careful planning with mutual confidence and co-operation between the buyer and seller. Such a job is performed by a Gisholt No. 24 hydraulic automatic lathe on cylinder heads at a plant of a diesel engine manufacturer. At the unload position, the hydraulically actuated arbor is brought up to the workpiece and the clamp is dropped into position. Arbor moves to right after chuck jaws are opened, indexes and a new piece is run up to the chuck. After workpiece is clamped, arbor is brought to right and machine is started. While machining goes on, finished piece is removed and a new one added to the right hand arbor. Machining time is 2 minutes and loading time is 0.5 minute. Without the arbor the loading time would have been longer than the machining time.

Automatic inspection of drilled holes, turnover of part to remove chips, centralized chip disposal, emergency stop and automatic lubrication are some features National Automatic Tool built into a Holeway unit shipped recently to an automotive plant. The eight-cylinder engine block is rotated 360 degrees and vibrated at the same time to remove chips before it passes to the inspection station. Horizontal and vertical traversing units each arranged with electrically interlocked plug gages indicate holes not drilled to depth. A flashing light on main control panel notifies operator that one or

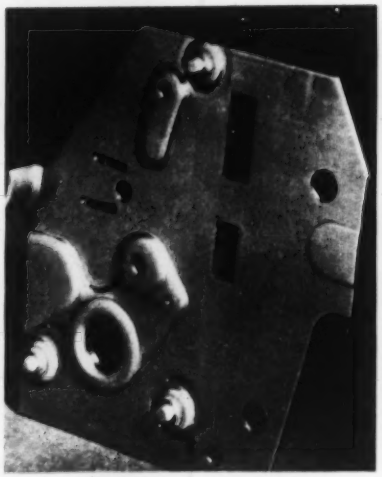
more holes are not drilled to depth and indicator lights on a plan view panel show the exact location of the hole improperly drilled.

Modernized Machine Building— Like all metalworking plants the machine tool builders are looking for better ways to get the job done, especially since their customers' needs are urgent. Lodge & Shipley, for example, reports it has instituted a policy of purchasing versatile machine tools such as automatic positioning jig mills to minimize manufacture and storage of special drill and boring jigs. The company also has converted as much as possible to all carbide planing. New planers added to that department supply the power and speed to use carbide efficiently. The combination enables the company to decrease machining time on main bed castings by 50 per cent.

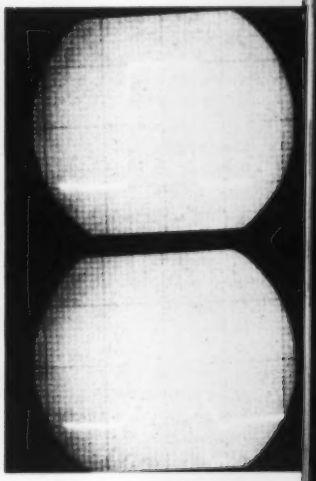
Cutting tools, punches and pins can make a variety of jobs more readily handled. Porter Precision Products, for example, stocks 21,000 sizes of punches and die bushings in 0.001-inch increments. Ace Drill Corp. supplies hardened tool steel bars in 10 and 12-foot lengths for use as knock out pins and punches. The lengths of hardened steel can be stored in the stockroom and portions cut off to fill specific needs as they arise. Material is rated 65 on the Rockwell C scale.

Carbide tools and carbide tipped drills are gaining new uses daily. Tough materials and higher working speeds make carbide operations necessary for a wide range of jobs.

Since the end of World War II, metalworking companies have maintained greater automaticity as their constant goal. Now in a rearmament period the need is greater than ever. New machines are a step toward that goal but there is a long wait before the need will be fully satisfied. Special tooling isn't always possible either. Tool engineers in machine tool plants are buried under a flood of requests and can't hope to answer all of them fast enough to satisfy everyone. A good look around the ASTE exposition and some artful probing at the technical sessions may provide the answers to immediate problems.



Lock plate is the type of pressed metal stamping that includes both draw and coining operations



Top, square wave calibrating pulse set for 50 tons. Bottom, load pulse application of 38 tons

Press Load Calculations:

Complicated problem of determining accurately and instantly the actual loads developed in a press under production conditions is solved electronically by a new instrument

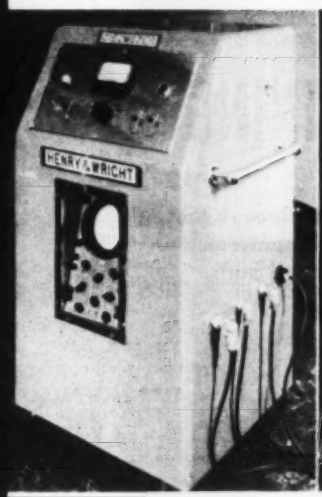
WHEN can you be sure power press capacity is equal to loads imposed during stamping operations? That question stumps die designers and press operators alike. Failure to answer it accurately can mean damaged presses, ruined dies and spoiled parts, all of which add up to unnecessarily large maintenance costs.

To get even an incomplete answer to the problem, skilled engineers spend hours on theoretical calculations. These calculations may be at wide variance with actual conditions because of variables in materials and die settings, particularly in progressive die work.

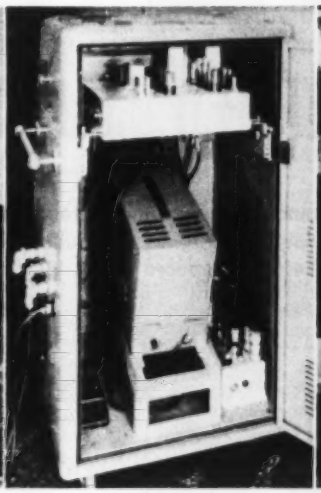
Theory Out — Dependence on theory now can be largely eliminated by a new electronic instrument which measures loads developed in press operations, indicates and records accurately maximum or instantaneous tonnage during each stamping cycle and stops the press when any predetermined overloading occurs. Developed by Henry & Wright Division of Emhart Mfg. Co., Hartford, Conn., the instrument makes possible improvements in metal stamping operations. It will be valuable in studying the initial running of a new die in a press. Normal load and how it compares to the press' capacity can be determined from the finished part and stock hardness.

In die work involving coining, sizing, squeezing around a boss or hub, or sharpening formed corners, pressure is built up rapidly. A slight adjustment of the crosshead downward may be all that is necessary to produce satisfactory work. If the adjustment is exceeded and is not checked carefully, pressure may go beyond the machine's capacity by 50 to 100 per cent. This condition may not be noticed by the machine operator even though he checks the product.

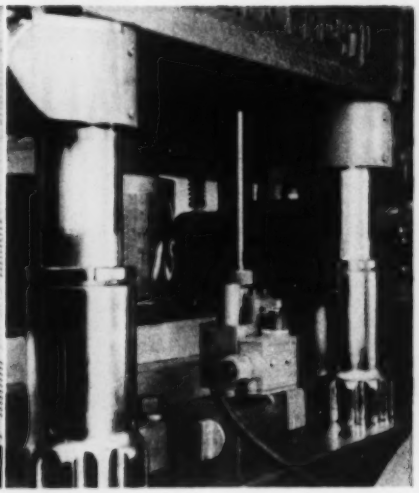
At one plant a coining operation



Dieometer, showing front panel with the direct-reading tonnage, meter oscilloscope and selector switch



Rear of unit. Note accessibility of the three principal components: Power supply, oscilloscope and amplifier



Side view of press showing switch for synchronizing load pattern on scope with cross head motion

Electronics Replaces Theory

in one step of a progressive die made proper setting of the die extremely critical. Considerable difficulty had been experienced in running the die. A check with the new instrument revealed that loads developed by the die when properly set were well within the press capacity. Attention was then focused on precise die setting.

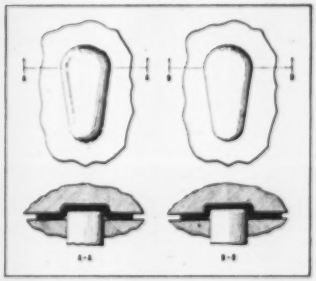
How It Works — Strain gages mounted permanently on each press guide rod feed directly into an amplifier. Output of this amplifier actuates a thyratron connected to the clutch causing the press to shut off instantly when it is overloaded. This type of shut-off arrangement is connected directly with the overload itself and not through a chain reaction of inertia elements from the main power source.

Operating concurrently with the unit is a synchronous switch that feeds the signal to an oscilloscope. This signal is timed so full load pattern appears in the center of the scope screen.

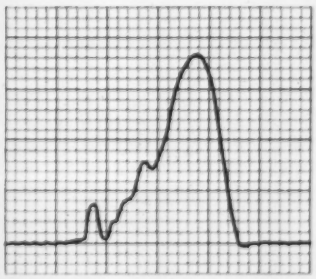
The instrument reveals eccentric loading; discloses whether it is within practical limits and suggests a die redesign if necessary, to bring loading within desired boundaries.

Reference Material — Once the tonnage of a die (which includes stock hardness as a factor) is recorded, the information is available as reference. It can be used to facilitate subsequent setups for rerunning the same job by enabling the operator to make his connection adjustments to reproduce the recorded tonnage for the die, insuring exact duplication of the previous setting. The unit can also determine when hardness or softness of stock exceeds predetermined limits. It shows the degree of punch or die dulling, which is reflected in increased loads.

Designed for use on Henry & Wright automatic dieing machines in progressive stamping operations, the instrument can be adapted to many other types of presses, particularly the heavy tonnage units employing pulling rods with an underneath drive.



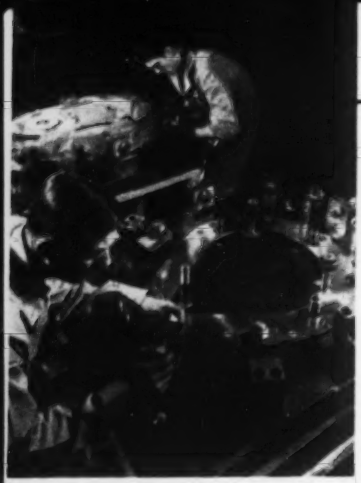
A-A cross section of a normally formed contour. B-B cross section of similar part with a small excess downward adjustment of crosshead



Load pattern pulse portrayed on scope of Dieometer screen when instrument connected with a press in operation

PALLETIZED MACHINING Speeds

Armor steel cases and carriers ride through processing line on pallets designed and built in transmission plant. Physical effort is reduced in handling heavy parts

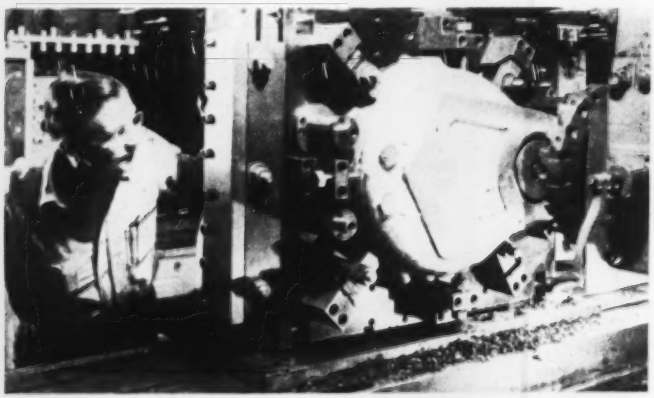


First pallet for transmission case being made ready in foreground. Loaded pallet is ready for machining line

ELIMINATING lost motion in machining operations on armor steel transmission cases and carriers for the medium tank enables Chevrolet-Cleveland Division of General Motors Corp. nearly to double its output over that possible with conventional methods. Palletization of the cases and carriers while in process is the answer to smoother, faster flow of work. Each of the components takes three pallets, designed by the division's engineers and built in the plant tool room.

Although this job entails a few units by automotive standards, it demonstrates the automakers' ability to trim the fat of inefficiency from the body of production. Not only is the job done faster but close tolerances are maintained and rejects minimized.

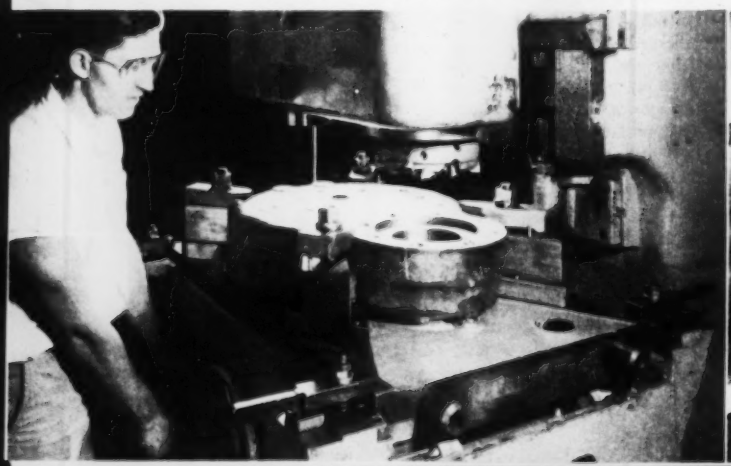
Production Problems—This isn't an operation where it can be said that the best and latest machines are tailor-made to fit the job. Not until machinery for the job was purchased was it possible to complete final plans for the processing line. It took a lot of digging around by Chevrolet staff to locate serviceable machinery adap-

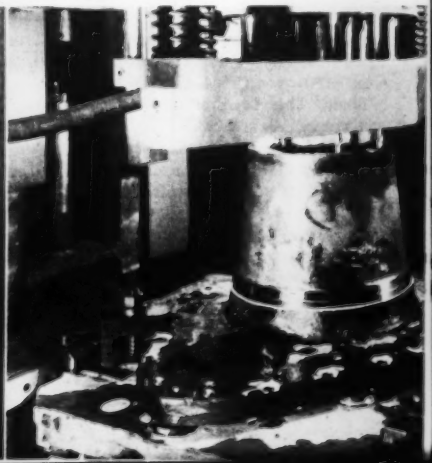


Carbide tipped horizontal cutter makes short work of removing cast armor steel on mounting face of transmission case in first machining step

Dowel holes reamed in preceding operation are used to locate case in third pallet. Boring pinion bore is first of nine operations performed in the series

Third pallet for carrier is positioned in multiple spindle drill for simultaneous drilling of eight holes in next machine. Pallet simplifies sliding heavy part into position for work





By ED KARPICK
Associate Editor

Flow of Tank Transmissions

table to the numerous machining operations involved.

New machines are used where possible but most of the equipment has logged several thousand operating hours. It wasn't always possible to get the exact machine best suited to the job. An example is the face milling operation illustrated here where the case is held vertically since a machine to do the cutting in a horizontal position wasn't available.

No Lifting—Number of operations performed in each pallet varies. Even where as few as two operations are performed in a single pallet, the setup is worthwhile. Roller conveyors are hooked up between adjoining machines with the beds at a standard height enabling work to be moved from one machine to another on the pallet without lifting. Workpieces slide into position for machining operations. Since the finished weight of the carrier is 195 pounds and the case 170 pounds, elimination of unnecessary lifting has obvious advantages.

Hoists and turnover fixtures are strategically located along the processing line to facilitate the change from one pallet to another. Here again is evidence of good planning because the shift can be made quickly and with little exertion by or danger of injury to the operator.

Reference Points—Foundry lays out the complete castings in a fixture in relation to contour, bosses and position for height. When the casting is positioned properly, four prick punch marks are made at predetermined locations around the contour and these marks are lined up in a target fixture for the first machining operation. This alignment provides a reference plane for all subsequent machining and avoids mistakes caused by irregular surfaces.

After the case is lined up in the first pallet, it moves to a Cincinnati milling machine where a cut is taken on the mounting face in the vertical position previously described. Two construction holes are next milled and reamed in a radial drill. The case is removed from the pallet and the opposite side is milled and ground. These operations performed on the open end that mates to the carrier face are the only ones on the case that do not use a pallet.

On loading into the second pallet the case is positioned on the two construction holes previously drilled in the mounting face. Four dowel holes are drilled and semi-finished reamed in a Carlton radial drill.

A Buhr multiple spindle unit next drills 20 holes in the flange and is followed by chamfering and tapping of all the holes in a Cincinnati Bickford radial drill fitted with a Bullard spacer. The last operation on pallet No. 2 is machining the back of the pinion bore on a vertical Footeburt.

Dowel holes reamed on the preceding pallet are used to locate the case in pallet No. 3. First two operations are boring and counterboring of the pinion bore. Next comes the boring and counterboring of the speedometer bore. The two drilling steps that follow produce eight 1-inch-8 tap holes and four $\frac{3}{8}$-inch-24 holes in the first setup and nine 1-inch-8 tap holes and eight $\frac{1}{2}$-inch 13 holes in the second. Two radial drills fitted with Bullard spacers chamfer and tap the 28 holes. Final operation on the case is the drilling, reaming and tapping of the drain hole on a right angle type fixture.

Carrier Machining—A target fixture is also used to line up the carrier in its first pallet. After proper positioning a radial drill is used to drill and semifinish ream four dowel holes. The 20 flange holes are drilled and counterbored in arrangements similar to those used for the case. Three of the holes are held to close limits as reference points for subsequent milling.

Following removal of the carrier from its pallet, the parting face is machined on a Sundstrand rotary mill using the three precisely located holes and the two dowel holes for location. A Potter & Johnson automatic turret lathe completes the center bore using the dowel holes for positioning.

Roughing out the pinion bore to $5\frac{1}{2}$-inch diameter and spotfacing are the two operations performed in the second pallet. In the last pallet two separate operations are required to drill eight holes for $\frac{1}{2}$-inch 13 tap and chamfer and tap these holes.

Gears for the tank transmission are also made in the same section of the plant set up for work on this subcontract. Heat treating and inspection facilities adjoin the machining area.

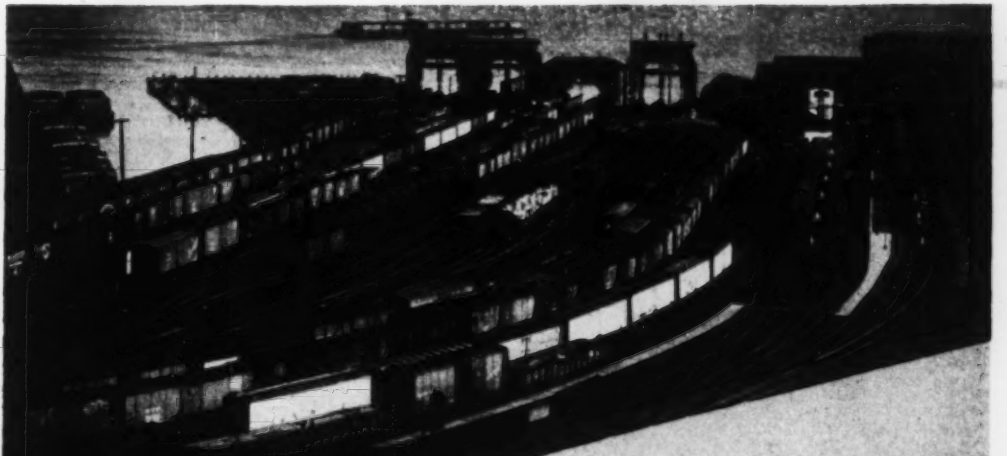
After an exacting inspection of all mating gears, the entire unit is assembled. A paint booth is set up near the assembly area where the final painting job is done. The assembled units are fastened onto wooden pallets by means of steel strapping and shipped to Fisher Body Division of General Motors, prime contractor on the tank job.

EXHIBITORS

1952 ASTE Industrial Exposition
International Amphitheater, Chicago
March 17-21

COMPANY	BOOTH
Accurate Bushing Co., Garwood, N. J.	838
Ace Drill Corp., Adrian, Mich.	144
Acme School of Die Design Engineering, South Bend, Ind.	644
Acme Steel Co., Chicago	1226
Acme Tool Co., New York	128
Adamas Carbide Corp., Harrison, N. J.	1301
Affiliated Screw Products, Chicago	708
Alemite Division, Stewart Warner Corp., Chicago	204
Allegheny Ludlum Steel Corp., Brackenridge, Pa.	1218
Allen Mfg. Co., Hartford, Conn.	116
Allied Products Corp., Detroit	225
Allis Chalmers Mfg. Co., Milwaukee	1728
Allison Co., Bridgeport, Conn.	1204
Alpha Corp., Greenwich, Conn.	706
American Cystoscope Makers Inc., New York	825
American Machine & Foundry, Brooklyn, N. Y.	1131
American Machinist, McGraw Hill Publishing Co., New York	632
American Pullmax Co. Inc., Chicago	1943
American S.I.P. Corp., New York	1917
American Society of Tool Engineers, Detroit	401
American Wheelabrator & Equipment Corp., Wishawaka, Ind.	1215
B. C. Ames Co., Waltham, Mass.	605
Amlintool Inc., New York	1030
Ampco Metal Inc., Milwaukee	1119
Anchor Coupling Co. Inc., Libertyville, Ill.	304
Anderson & Sons Inc., Westfield, Mass.	834
F. E. Anderson Oil Co., Portland, Conn.	1309
Angier Corp., Framingham, Mass.	141
R. B. Annis Co., Indianapolis	614
Armstrong Bros. Tool Co., Chicago	133
Aro Equipment Corp., Bryan, O.	1810
Arrow-Hart & Hegeman Electric Co., Hartford, Conn.	2042
Arrow Tool & Reamer Co., Detroit	117
Atlas Press Co., Kalamazoo, Mich.	1510
Atrax Co., Newington, Conn.	1722
Austenal Labs. Inc., New York	552
Automotive Industries Magazine, Philadelphia	800
Eric R. Bachmann, Long Island City, N. Y.	1817
Barnes Drill Co., Rockford, Ill.	1808
W. O. Barnes Co., Detroit	1300
E. A. Baumbach Mfg. Co., Chicago	1714
Bausch & Lomb Optical Co., Rochester, N. Y.	813
Bay State Abrasive Products Co., Westboro, Mass.	409
Beaver Tool & Engineering Corp., Royal Oak, Mich.	1219
Beckett-Harcum Co., Wilmington, O.	1116
Bellows Co., Akron, O.	1424
Benchmaster Mfg. Co., Gardena, Calif.	1805
Bendix-Westinghouse Automotive Air Brake Co., Elyria, O.	1717
Bijur Lubricating Corp., Rochelle Park, N. J.	641
Black Drill Co., Cleveland	446
Edward Blake Co., W. Newton, Mass.	1711
Henry P. Boggis & Co., Cleveland	1709
Boice-Crane Co., Toledo, O.	136
Bokum Tool Co. Inc., Detroit	121
Boyar-Schultz Corp., Chicago	1438
Bramson Publishing Co., Detroit	220
Brinnell Co., Granby, Conn.	1916
Bristol Co., Waterbury, Conn.	311
British Industries Corp., New York	1205
Brown & Sharpe Mfg. Co., Providence, R. I.	1435
Charles Bruning Co. Inc., Chicago	746
Brush Development Co., Cleveland	821
Bryant Chucking Grinder Co., Springfield, Vt.	604
Buck Tool Co., Kalamazoo, Mich.	153
Burg Tool Mfg. Co., Los Angeles	1113
Cadillac Stamp Co., Detroit	853
Campbell Machine Division, American Chain & Cable Co., Bridgeport, Conn.	1126
Capewell Mfg. Co., Hartford, Conn.	2027
Carboloy Dept., General Electric Co., Detroit	539
Carborundum Co., Niagara Falls, N. Y.	1326
W. R. Carnes Co., Madison, Wis.	137
Chicago Dial Indicator Co., Chicago	511
Chicago Pneumatic Tool Co., New York	425
Chicago Tool & Engineering Co., Chicago	310
Chicago Tramrail Co., Chicago	218
Chicago Wheel & Mfg. Co., Chicago	314
Circular Tool Co. Inc., Providence, R. I.	634
Cities Service Oil Co., Chicago	346
Cleco Division, Reed Roller Bit Co., Houston	413
Cleveland Tapping Machine Co., Canton, O.	300
Collins Micro-Flat Co., Los Angeles	608
Colonial Broach Co., Detroit	1201
Columbia Enterprises Inc., Grays Lake, Ill.	341
Columbia Export Co. Inc., New York	1909
Commander Mfg. Co., Chicago	1238
Connors & Davis Sales Corp., W. Springfield, Mass.	215
Conover-Mast Publications Inc., New York	152
Continental Tooling Service Inc., Dayton, O.	842
Coso Corp., New York	1750
Arthur A. Crafts Co. Inc., Boston	741
Crane Packing Co., Chicago	1908
Crucible Steel Co. of America, New York	1401
Crystal Lake Grinders, Crystal Lake, Ill.	1138
Dake Engine Co., Grand Haven, Mich.	1019
Danly Machine Specialties Inc., Chicago	1610
Dayton-Rogers Mfg. Co., Minneapolis	1843
Dazor Mfg. Corp., St. Louis	845
De Castro & Associates, Los Angeles	1904
Delpark Corp., Lebanon, Ind.	1230
Delta Power Tool Division, Rockwell Mfg. Co., Milwaukee	209
Detrex Corp., Detroit	2035
Detroit Power Screwdriver Co., Detroit	140
Detroit Stamping Co., Detroit	115
Dewalt Inc., Lancaster, Pa.	2005
Eugene Dietzgen Co., Chicago	332
Dilley Mfg. Co., Cleveland	243
Diversified Metal Products Co., Los Angeles	1239
DoAll Co., Des Plaines, Ill.	1634
Doerr Electric Corp., Electro Machines Inc., Cedarburg, Wis.	208
Doughty Labs Inc., New York	216
Dow Mechanical Corp., Thompsonville, Conn.	711
Dumore Co., Racine, Wis.	404
Durable Punch & Die Co., Chicago	214
Durant Mfg. Co., Milwaukee	837
Dynatomic Corp., Chicago	840
Eagle Grinding Wheel Co., Chicago	840
Eastern Machine Screw Corp., New Haven, Conn.	450
Eastern Sales Co., Bridgeport, Conn.	1816
Eastern Tool Co., E. Hartford, Conn.	102
Eastman Kodak Co., Rochester, N. Y.	518
Eclipse Counterbore Co., Detroit	526
Elastic Stop Nut Corp. of America, Union, N. J.	217
Electro-Arc Mfg. Co., Ann Arbor, Mich.	100
Electro-Mechano Co., Milwaukee	419
Elgin National Watch Co., Abrasive Division, Elgin, Ill.	740
Elox Corp., Clawson, Mich.	318
Enco Mfg. Co., Chicago	610
Engineering Mfg. Co., Sheboygan, Wis.	125
Engineers Specialties Division, Buffalo, N. Y.	633
Engis Equipment Co., Chicago	525
Ercona Corp., New York	515
Erickson Steel Co., Tool Division, Cleveland	1127
Errington Mech. Laboratory Inc., Staten Island, N. Y.	212
Ettco Tool Co., Brooklyn, N. Y.	1243
Euclid Tool Engineering Co., Cleveland	545
Everede Tool Co., Chicago	1012
Ex-Cell-O Corp., Detroit	1708
Federal Machinery Sales Co., Chicago	1108
Federal Products Corp., Providence, R. I.	733
Field Abrasive Specialty Mfg. Co., Dayton, O.	312
Firth-Sterling Steel & Carbide Corp., Pittsburgh	725
Fonda Gage Co. Inc., Stamford, Conn.	715
Foote Bros. Gear & Machine Co., Downers Grove, Ill.	1109
Gairing Tool Co., Detroit	738
Gammons-Hoaglund Co., Manchester, Conn.	1231
Garlock Packing Co., Palmyra, N. Y.	105
Garvin Bros. Inc., South Bend, Ind.	429
Geneva Machine & Tool Corp., Tampa, Fla.	736
Gerator May Corp., Baltimore	1801
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.	1705
L. H. Gilmer Co., division of U. S. Rubber Co., Philadelphia	236
Globe Heat-Seal Inc., Los Angeles	1809
Govro Nelson Co., Detroit	119
Graham Machine Tool Co., New York	1911
Graymills Corp., Evanston, Ill.	224
Green Instrument Co. Inc., Cambridge, Mass.	805
F. T. Griswold Mfg. Co., Wayne, Pa.	832
Grobet File Co. of America Inc., New York	742
Gulf Oil Co., Pittsburgh	647
Guthery Machine Tool Corp., New York	1827
H. E. B. Machine Tools Inc., New York	1800
H & H Research Co., Detroit	128
Hammond Machinery Builders Inc., Kalamazoo, Mich.	1628
Hanchett Magna-Lock Corp., Big Rapids, Mich.	645
Handy & Harman, New York	1818
Hanna Engineering Works, Chicago	1625
Hannifin Corp., Chicago	1609

(Please turn to Page 137)



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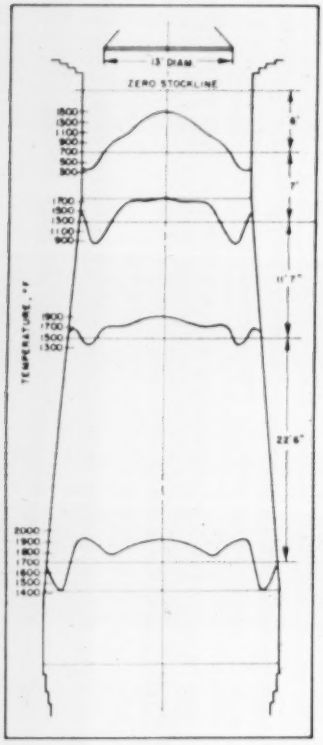


Fig. 10 — Temperature at various planes, figures in degrees Fahrenheit

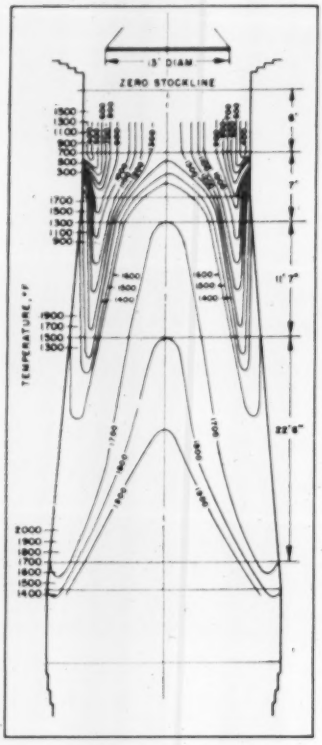


Fig. 11 — Thermal conditions within the furnace, No. 442 operation

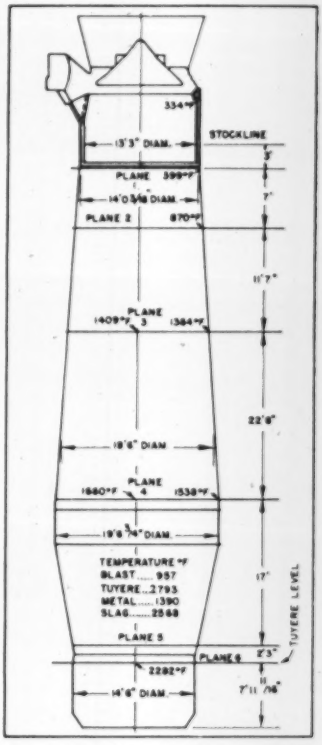


Fig. 12 — Temperature observations taken at various points in the furnace

BLAST FURNACE PRACTICE

VI(c)—Generation, Recovery and Use of Heat

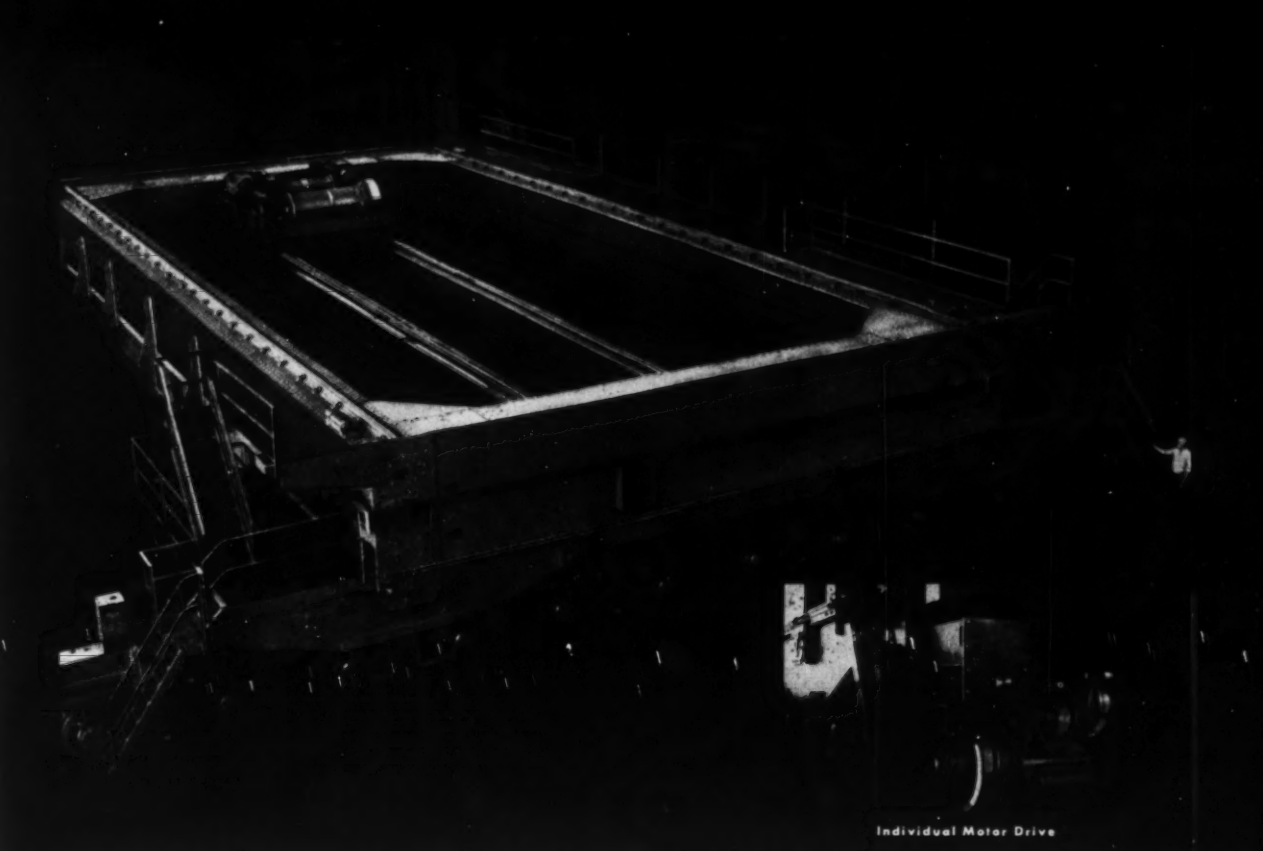
Thermal data on a South Chicago stack are compared to arrive at some conclusion concerning the amount of carbon solution loss. Stock travel exerts little influence on reaction

TWO Northern furnace operations, one designated the Mathesius[6] and the other No. 442[2], were conducted on the No. 4 stack of the United States Steel Co., South Chicago Works. While separated by 10 years, both used Lake ores comparable in chemical composition and physical properties; also comparable were the coke, weight and thermal effects of slag, and the grade of iron produced. But with the weight of air used in the No. 442 operation, the weight of coke, the weight of ore and the carbon solution loss, were all greater than for the Mathesius operation.

Figs. 10 and 11 show the thermal conditions in the furnace with the No. 442 operation, and clearly indicate the high temperature (1652 to 2012° F) which would permit the reversion of CO_2 to CO which existed in the furnace as high as plane No. 2 with this depth of high temperature in the center of the furnace shaft a large carbon solution loss would be inevitable because of the response to the principles and reactions of the gas producing phase of the operation.

By CHARLES E. AGNEW
Consultant
Blast Furnace and Sintering Plant Operations
Cleveland

Temperatures Comparable — From the premise that the two North operations were comparable in their bosh and hearth temperatures (Fig. 9), the high-temperature zone of the No. 442 operation up through the center of the furnace must have been caused by the volume of heat carried through the furnace by the weight and volume of the gas; therefore, because of a slower blowing rate, the loca-



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Illustrated is a 350-ton, 4-girder, 24-wheel Ladle Crane bridge with six individual motor drives.

The six motors are carried on the individual trucks, each motor being coupled to a worm reduction unit on the drive axle. With this type of drive, the usual squaring shafts are eliminated.

On account of the moving mass to be controlled, which would require the usual hydraulic brake for each drive, an air braking system is provided.

tion of the high-temperature plane in the Mathesius operation would necessarily be lower in the furnace. Since there is difference of 11.46 per cent in the weight of air used in the two operations, the high-temperature plane in the Mathesius operation could have been below plane No. 4.

Recorded data of the No. 442 operation does not show the weight of flue dust produced, but since the Fe content of the ore used was virtually the same as that used in the Mathesius operation, the increased weight of ore used to produce an equal weight of iron indicates a greater output of dust in No. 442 operation than in the Mathesius.

The obvious deduction to be drawn from the comparison of the two North operations is that iron production was increased in the No. 442 operation at a sacrifice of thermal economy, and acceptance of flue dust losses; and the thermal sacrifice was largely reflected in carbon solution loss since the difference in fuel rates is 260 pounds per gross ton iron and in carbon solution loss, 149.50 pounds.

In the two North operations, where other operating conditions are comparable, the blowing rate alone appears to be the cause of difference in the weight of carbon lost to solution. However, a comparison of the South and East operations, where there is a radical difference in the character of the raw materials used, as well as in blowing rates, indicates effects other than the blowing rate influence on the carbon solution loss.

South, as shown in Table V, Part VI(a), has an ore burden low in iron content and high in gangue content, gangue being both volatile and nonvolatile; coke, low in fixed carbon and high in ash; a large percentage of fluxing stone in the charge; produces a heavy weight of slag per ton of iron; a weight of blast which produces a heavy weight of gas per ton of iron.

East, as shown in Table V, has an ore burden high in iron content and low in gangue content, all gangue being nonvolatile; coke, high in fixed carbon and low in ash; a small percentage of fluxing stone in the charge; produces approximately one-half the weight of slag per ton of iron compared to South; a blast weight which produces approximately one-half the gas weight of South.

Solution Loss the Same—Despite these directly opposite burden and operating conditions carbon solution loss for the two operations is virtually the same since there is only 7.97 pounds difference in the weight of carbon lost, but the fuel rates differ by 1277.85 pounds. If theoretical reasoning regarding the independent nature and cause of the carbon solution loss reaction is correct, the depth of the high-temperature zone at South and East would have to be comparable.

The weight of air blown at South is greater than at No. 442 North, as shown in Table IX, STEEL, Part VI(b). Therefore with similar average temperature conditions in the bosh and hearth (Fig. 9) a high temperature plane well up in the South shaft would reasonably be expected, but the actual temperatures in the South shaft (Fig. 12) were consistently lower than they were in No. 442 North (Fig. 10), with little opportunity for a reversion of CO_2 to CO as low in the furnace as Plane No. 4, and none above it. Data in Tables IX and X clearly indicate the lower temperatures in the South shaft were due to the release of CO_2 from burden materials, the heat having been consumed with the release. East burden materials are virtually free of CO_2 but having less than half the blast weight used in the South operation, and a heavier burden of volatile-free materials descending through the shaft, it could not deliver the volume of heat from bosh to shaft which would be necessary to cause high temperature there, even though temperature in the bosh is comparable to South. Although there is difference in the cause of the indicated similarity in shaft temperatures between South and East, the cause would be immaterial to the gas producing phase of the operations and, therefore, opportunity for carbon solution loss would be comparable.

Figures Check Closely—Pounds of iron oxides which must be reduced to produce a ton of iron are virtually the same in South and East (see Table X). With a close check in the pounds of iron oxides reduced, and in bosh temperatures, there must have been a similar close check in the pounds of oxygen released in the bosh which could have caused similar weight of carbon solution loss. Bureau of Mines data (technical paper No. 391) indicate 80.5 per cent of the iron of South was reduced in the furnace shaft and 19.5 per cent in the bosh. Because of the several close checks in temperature conditions between South and East, it is reasonable to assume that percentages of iron oxide reduced in East above and below a comparable plane No. 4 were similar to those of South. However, South had a light burden and fast stock travel while East had a heavy burden and slow stock travel, but indicated conditions of iron oxide reduction are similar.

Oxygen required for carbon combustion, per pound of carbon, would be the same in both operations but since South used approximately twice the weight of air used in East, it would consume approximately twice the weight of carbon in an equal unit of time. Therefore, inevitably the stock travel rate in South would be much faster than in East, indicating that the stock travel rate has little, if any, bearing on the weight of carbon lost to solution.

Bureau of Mines data (technical paper No. 442) indicates only 24.4 per cent of iron of North was reduced in the furnace shaft and 75.6 per cent in the bosh. Temperature measurements (Figs. 10 to 12) indicate that working dimensions of the shaft and bosh are determined by the location of the plane where fusion begins and not by the construction lines. The difference in the percentage of iron reduction determined by the Bureau of Mines measurements at the Southern and Northern furnace operations indicates that there is a wide range in the thermal conditions under which iron oxide can be reduced in a blast furnace.

Based upon the principles of gas producer operation and so long as any oxygen is released in the high-temperature zone of the bosh there will be a proportionate amount of carbon solution loss.

[5] Technical Paper No. 442 U. S. Bureau of Mines.

[6] "Use of High Heat in Mesabi Practice," by Walter Mathesius, *Transactions* AIME, 1915.

Lee Wilson

ANNEALING FURNACE DATA SHEET

NUMBER TWO

BASIC ADVANTAGES OF LEE WILSON SINGLE-STACK PORTABLE BASE FURNACES:

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SINGLE-STACK PORTABLE BASE FURNACE INCREASES PRODUCTION

ACCELERATED HEATING AND COOLING

Users of the Single-Stack Portable Base type annealing furnace realize more tons per stand per hour than those employing any other method. Accelerated heating and cooling are important factors. The heating tubes are equidistant from every part of the coil. (See Fig. 3.) In a multiple-stack furnace the surfaces of the coils are necessarily at varying distances from the heating source. This means the furnace does its job faster — more efficiently.

MAXIMUM LOADING FACTOR

It is difficult to accumulate coils of uniform size and stack them evenly in a multiple-stack furnace — the more stacks the more difficult. (Fig. 1) To prevent overheating the smallest stacks, the heat input must be reduced in the whole furnace.

UNIFORM LOADING

Smaller coils then "loaf" while waiting for larger coils to heat. Reduced input requires longer time to bring up to heat. Obviously the cooling down operation, too, requires a longer operation. Single-Stack Portable Base furnaces can be loaded uniformly and the heating is without delay. (Fig. 2) Heating and cooling time is directly proportional to size of coils. No waiting, overheating or reanneal. Minimum number of stands are out of operation. Result: Single-Stack Portable Base production is for all practical purposes double that of larger multiple stacks.

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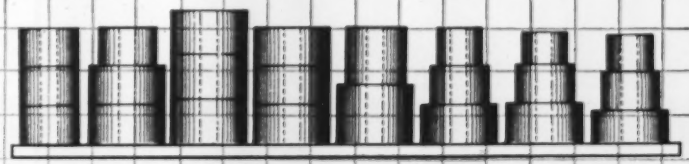


Fig. 1 — Typical piling in an eight-stack furnace, spread in a single line to show the unevenness of coil stacks. The furnace must be held to make sure the largest stack is thoroughly annealed. This charge would require approximately 44 hours.

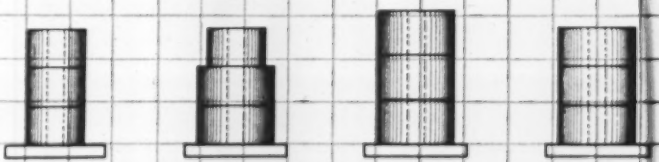
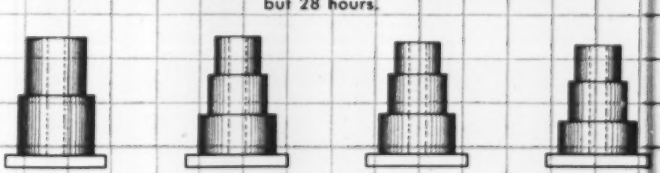


Fig. 2 — The same piling for Single-Stack Portable Base furnaces. The smaller stack would be complete in 17 hours. Because there is no fear of overheating small stacks, even the largest stack would be ready to go in but 28 hours.



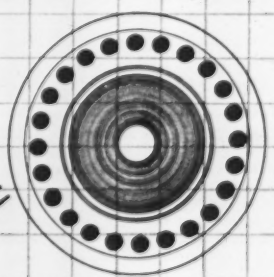


Fig. 3 — Single-Stack Portable Base furnaces bring the charge to the correct heat faster because the heating tubes are equidistant from every part of the coil. What's more the heating can be regulated to make sure just the right amount of heat is applied at the right times.

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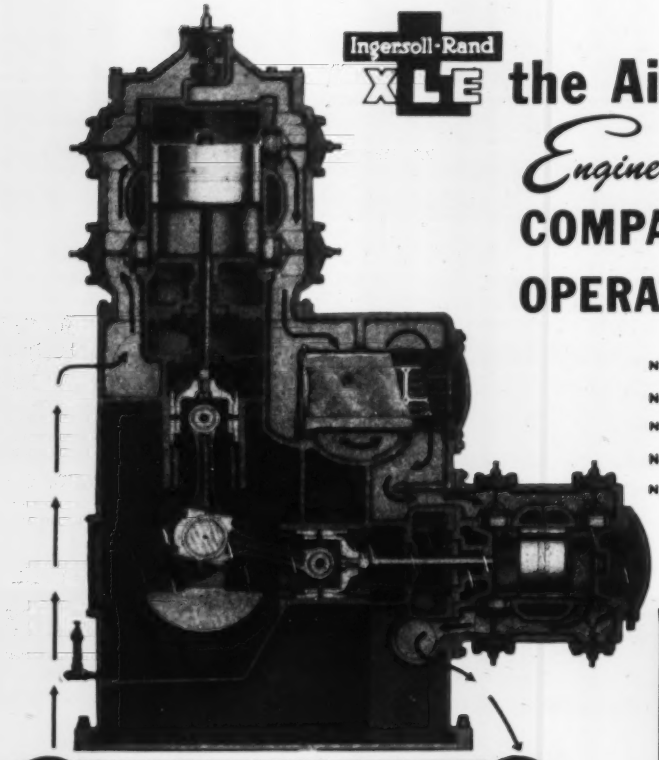

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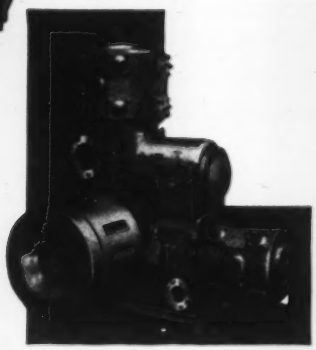

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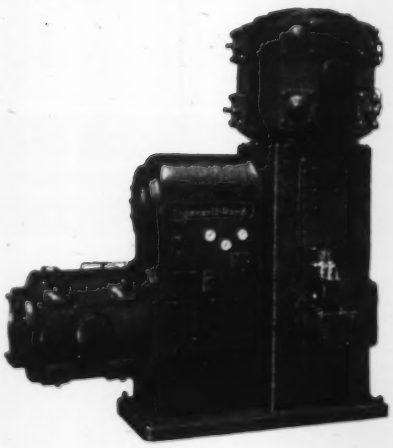

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TECHNICAL PROGRAM

American Society of Tool Engineers 20th Annual Meeting
Chicago, Ill.

Monday, March 17

Precision Control Day

Morning Session (Stockyards Inn)

9:00 a.m.—Chairman: Prof. O. W. Boston, chairman, production engineering dept., University of Michigan
"Co-operation Between Research Centers and Engineering Society"—by Dr. W. E. Mahin, director of research, Armour Research Foundation.

9:00 a.m.—Chairman: R.C. Peterson, manager, Peterson Engineering Co.
"The Part of Standards in Better Consumer Relations"—by R. E. Gay, president, Bristol Brass Co.
"Relation of the Tool Engineer to Company Standards"—by Dr. John Gaillard, American Standards Association.

9:00 a.m.—Chairman: R. A. Osborne, district manager, Peninsular Steel Co.
"Strength of Bolted Assemblies"—by John S. Davey, assistant general manager of sales, Russell, Birdsall & Ward Bolt & Nut Co.

Afternoon Session (Stockyards Inn)

1:30 p.m.—Chairman: D. E. Hawkinson, sales engineer, Greenlee Bros. & Co.
"Criteria for Selecting Sampling Methods"—by Dr. J. V. Strela, staff statistician, Thompson Products Inc.

2:05 p.m.—Chairman: F. J. Kampmeier, vice president, Ingersoll Milling Machine Co.
"Fixed-Gage Standards and Practice"—by W. H. Gourlie, standards engineer, Sheffield Corp.

2:50 p.m.—Chairman: H. F. Ruehl, Fairbanks, Morse & Co.
"Production-Line Hardness Testing"—by V. E. Lysaght, sales manager, Wilson Mechanical Instrument Division.

3:30 p.m.—Panel Discussion: "Turning and Forming Tolerances"
Moderator: R. B. Knoth, assistant superintendent of manufacturing engineering, Western Electric Co. Inc.
Robert Eckholm, chief inspector, Illinois Tool Works; E. L. Fay, quality control manager, Deere & Co.; J. T. Leyden, service engineer, Crucible Steel Co. of America; N. G. Meagley, manager, statistical quality control, Willys-Overland Motors Inc.; G. R. Morin, chief sales engineer, Jones & Lamson Machine Co.; and D. J. Williams, president, Connecticut Tool & Engineering Co.

Evening Session

8:00 p.m.—North Ballroom, Hotel Conrad Hilton
Chairman: E. Y. Seborg, Barnes Drill Co.
"Contour Milling of Sheet Stock"—by Jesse Daugherty, consultant, Giddings & Lewis Machine Tool Co.

8:00 p.m.—Red Lacquer Room, Palmer House.
Chairman: G. H. Rigeman, George D. Roper Corp.
"Control of Quality on Mass Produced Engineering Parts"—by John Loxham, managing director, Sigma Instrument Co. Ltd.

8:00 p.m.—Normandie Lounge, Hotel Conrad Hilton
Chairman: G. C. Johnson, W. F. & John Barnes Co.
"Improved Measurement as a Way Toward Safer Tolerances"—by Jacques DeSangy, sales director Societe Genevoise d'Instruments de Physique
Plant Tours (Leave at 9:00 a.m. from Hotel Conrad Hilton
International Harvester Co., Mfg. Division, Lindbergh Steel Treating Co., Scully Jones & Co. and Verson Allsteel Press Co.

Tuesday, March 18

Metal Cutting Day

Morning Session (Stockyards Inn)

9:00 a.m.—Chairman: Vitas Thomas, president, Tomco Products
"Complete Deep Hole Production from Trepanning to Final Finish"—by J. S. Ladendorf, deputy director, Wohlfahrt Engineering & Mfg. Co.

9:00 a.m.—Chairman F. T. Wruk, executive vice president, Peerless Machine Co.
"Broaching of Internal Gears"—by J. A. Psenka, engineer, National Broach & Machine Co.

9:00 a.m.—Chairman W. N. Reinhardt, assistant superintendent, Racine Tool & Machine Co.
"Electromechanical Machining of Hard Materials"—by M. F. Jadkins, chief engineer, Carbide Division, Firth-Sterling Steel & Carbide Corp.

Afternoon Session (Stockyards Inn)

1:30 p.m.—Chairman: W. C. Davidson, tool engineer, Modine Mfg. Co.
"Speed and Feed Selection for Efficient Drilling"—by C. J. Oxford, chief engineer, National Twist Drill & Tool Co.

2:05 p.m.—Chairman: G. S. Strambeck, education co-ordinator, Racine Vocational School
"Precision Hole Locating Meth-

NEW!
SET!
TRIPPED!

DODGE

Tri-Matic Overload Release

FOR THE FAMOUS DODGE TORQUE-ARM SPEED REDUCER

1 *LOOSENS THE BELTS*

2 *CUTS OFF POWER*

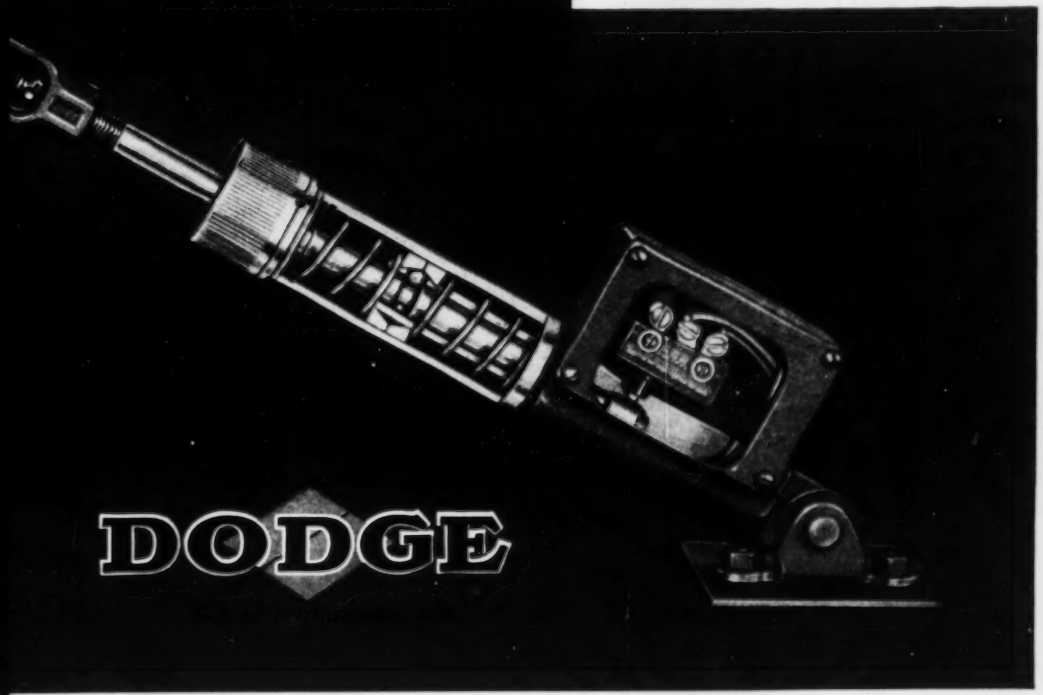
3 *GIVES A WARNING*

Protects Your Machines

Mechanically . . Electrically

POSITIVELY!

- The Dodge Tri-Matic Overload Release is a simple, positive acting unit that replaces the standard torque arm that is regularly furnished with the Dodge Speed Reducer. (The two are interchangeable.)
- Pressure exerted by an excessive load causes a piston to move lengthwise through the unit, activating the mechanism instantly.
- This movement shortens the torque arm, loosens the belts and cuts off current simultaneously.
- A warning system can be hooked up to the micro switch of the Tri-Matic—to activate bell, siren or light.
- The Tri-Matic is calibrated for adjustment to the load conditions of any job. It can be set to act at any desired load up to the reducer's maximum capacity.
- It is easy to reset the Tri-Matic. Just pull the speed reducer back into position. This automatically cocks the release mechanism.
- The Dodge Tri-Matic Overload Release is available from distributors' stocks in sizes for all Dodge Torque-Arm Speed Reducers —in either single or double reduction series.



DODGE

ods"—by F. C. Victory, chief engineer, Moore Special Tool Co.

2:50 p.m.—Chairman: G. F. Tigges, tool engineer, Modine Mfg. Co.
"Drill Jig Design for Secondary Operations"—by J. I. Karash, processing engineer, Reliance Electric & Engineering Co.

3:30—Panel Discussion: "Drilling"
Moderator: C. C. Waldo, assistant master mechanic, Electromotive Division, General Motors Corp.
M. S. Aljanich, superintendent of tool cribs, Caterpillar Tractor Co.; E. A. Brezina, charge of production design & application, Cleveland Twist Drill Co.; J. Y. Riedel, tool steel engineer, Bethlehem Steel Co.; R. A. Schafer, chief development engineer, National Automatic Tool Co.; B. D. Smith, general supervisor, mechanical engineering research, International Harvester Co.; E. Von Hambach, research and development engineer, Carpenter Steel Co.

Evening Session

8:00 p.m.—Normandie Lounge, Hotel Conrad Hilton
Chairman: O. H. Arndt, Tractor Engineering Dept., Massey-Harris Co.
"Recent Advances in Metal Cutting Science and Practice"—by Hans Ernst, research director, and Dr. M. E. Merchant, senior research physicist, Cincinnati Milling Machine Co.

8:00 p.m.—North Ballroom, Hotel Conrad Hilton
Chairman: R. T. Jones, assistant chief tool engineer, Walker Mfg. Co.
"New Developments in Cemented Carbides"—by J. S. Gillespie, manager of product sales and I. L. Wallace, manager of engineering, Carboloy Dept. of General Electric Co.

8:00 p.m.—Red Lacquer Room, Palmer House
Chairman: G. W. Christiansen, assistant sales manager, Racine Tool & Machine Co.
"Dynatomics—A New Concept in Metal Removal"—by Kenneth R. Blake, consulting physicist and vice president, Metalloid Corp.
Plant Tours: (Leave 9:00 a.m. from Hotel Conrad Hilton)
Aircraft Engine Division, Ford Motor Co., Clearing Machine Co., Electromotive Division, General Motors Corp., Kropp Forge Co., Lindbergh Steel Treating Co., Motorola Inc. and Scully Jones & Co.

Wednesday, March 19

Materials Forming Day

Morning Session (Stockyards Inn)

9:00 a.m.—Chairman: H. M. Chambers, tool engineer, International Vermiculite Co.
"Tool Engineers and Electroforming"—by Dr. C. L. Faust, head, Electromechanical Engineering Division, Battelle Memorial Institute.

9:00 a.m.—Chairman: R. W. Wallace, technical superintendent, Sangamo Electric Co.
"Multiple Screw Machine Tooling & Methods"—by C. R. Morgan, consulting engineer, Cone Automatic Machine Co.

9:00 a.m.—Chairman: Prof. J. N. Edmondson, Production Division, Industrial Engineering Dept., Ohio State University.
"Aptitude Tests Aid Production Personnel"—by Dr. J. E. King, director, Industrial Psychology Inc.

Afternoon Session

(Stockyards Inn)

1:30 p.m.—Chairman: R. E. Bodendoerfer, purchasing agent, J. M. Nash Co.
"Die Design for Metal Blanking"—by R. C. Berliner, owner, C. B. Cash Mfg. Co.

2:05 p.m.—Chairman: C. E. Miller, sales engineer, Schlitt Industrial Supply Co.
"Die Design for Metal Drawing"—by C. R. Cory, engineer, charge die engineering, Fisher Body Division, General Motors Corp.

2:50 p.m.—Chairman: E. J. Kane, chief tool designer, Sangamo Electric Co.
"Selection and Treatment of Die Steels"—by Dr. S. G. Fletcher, chief metallurgist, Latrobe Electric Steel Co.

3:30 p.m.—Panel Discussion: "Metal Stamping Dies and Operations"
Moderator: S. H. Ericson, chief tool engineer, American Flange & Mfg. Co. Inc.
Vasil Georgeff, chief engineer, Danly Machine Specialties Inc.; Walter Gulliksen, superintendent, Worcester Pressed Steel Co. (representing Pressed Metal Institute); H. F. Jahn, president, B. Jahn Mfg. Co. (representing National Tool & Die Manufacturers Association); P. F. Rehner, manager of sales, Carbide Division, Allegheny-Ludlum Steel Corp.; E. J. Reitler, sales engineer, Firth-Sterling Steel & Carbide Corp.; and Ralph Weisbeck, chief engineer, Wales-Strippit Corp.

Evening Session

8:00 p.m.—Red Lacquer Room, Palmer House
Chairman: H. G. Heimann, industrial engineer, Cleaver Brooks Co.
"Machining and Heat Treatment of Boron Steels"—by J. D. Graham, works metallurgist, Farm Tractor Division, International Harvester Co.

8:00 p.m.—North Ballroom, Hotel Conrad Hilton
Chairman: R. W. Lund, sales engineer, Sterling Grinding Wheel Division.
"Sand Casting with Croning Process Shell Molds"—by Richard Herold, manager, Foundry Products Dept., Borden Co.

8:00 p.m.—Normandy Lounge, Hotel Conrad Hilton
Chairman: C. A. Woodcock, chief engineer, John W. Hobbs Corp.
"New Precision Performance Specimens for Surface Finish Control"—by Dr. C. R. Lewis, staff engineer, Chrysler Corp.
"The Surfagage—An Instrument for Roughness Measurement"—

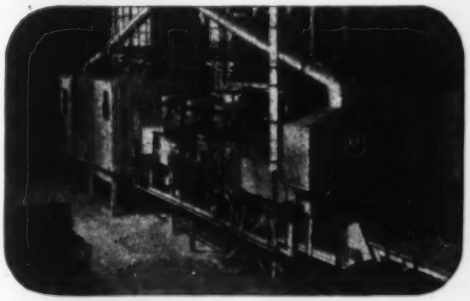
Straight lengths of brass and copper tubing are also bright and scale-free annealed in this EF gas fired furnace. Capacity 4000 lbs. per hour.

EF gas fired forced convection continuous roller hearth special atmosphere furnace bright annealing long straight lengths of tubing.

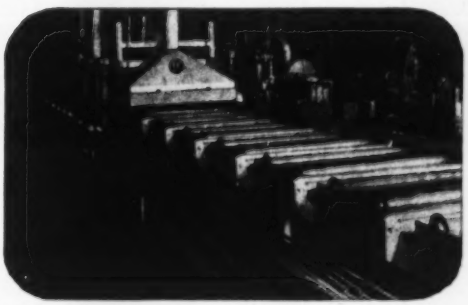
ANNEALING TUBING BRIGHT and CLEAN *Continuously*

• We have built many outstanding production furnaces for processing copper, brass, stainless, aluminum, nickel silver and other ferrous and non-ferrous tubing . . . in large and small coils . . . straight lengths, long and short, and in various diameters . . . also for many other products and processes.

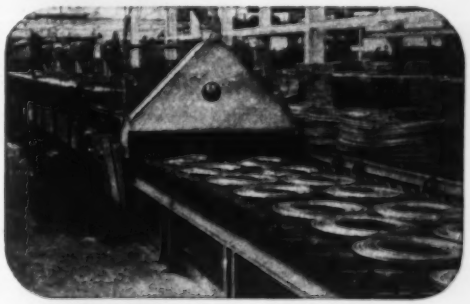
Put your production furnace problems up to experienced engineers . . . *it pays.*



A special atmosphere belt conveyor electric furnace annealing short lengths of alloy tubing—operates at temperatures up to 2040° F.



3000 lbs. of steel tubing, per hour, are bright normalized in this EF gas fired radiant tube type special atmosphere furnace.



Straight lengths of tubing up to 5" in diameter and ¾" thick are also annealed in this EF forced circulation roller hearth furnace.

Gas-Fired, Oil-Fired EF and Electric Furnaces

for any Process, Product or Production

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WILSON ST. at PENNA. R. R. *Salem - Ohio*

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by A. F. Underwood, head; J. B. Bidwell, assistant head; and J. H. Brehms, resident engineer, Mechanical Engineering Dept., General Motors Research Laboratories Division, General Motors Corp.

Plant Tours: (Leave at 9:00 a.m. from Hotel Conrad Hilton) Aircraft Engine Division, Ford Motor Co., Clearing Machine Co., Electromotive Division, General Motors Corp., International Harvester Co., Melrose Park Plant, Kropp Forge Co., Scully Jones & Co., Thor Corp., U. S. Steel Corp. and Western Electric Co.

Thursday, March 20

Grinding and Finishing Day

Morning Session (Stockyards Inn)

9:00 a.m. — Chairman: D. H. Brighton, staff engineer, Planning Dept., Caterpillar Tractor Co.

"Functions of Cutting Fluids in Modern High Speed Machining" —by H. A. Erickson, chief engineer, D. A. Stuart Oil Co. Ltd.

9:00 a.m.—Chairman: R. W. Bayless, supervisor, Education & Training Dept., Caterpillar Tractor Co.

"Production Grinding of Cylindrical Parts Requiring Extreme Precision"—by James Meehan, Sales Division and A. E. Mandeville, application engineer, Brown & Sharpe Mfg. Co.

9:00 a.m.—Chairman: D. I. Hartter, scheduling manager, Caterpillar Tractor Co.

"Cupola Deoxidation Improves Machinability of Iron Castings" —by F. S. Kleeman, consulting engineer.

Afternoon Session (Stockyards Inn)

1:30 p.m. — Chairman: J. O. Knight, factory manager, L. R. Nelson Mfg. Co. Inc.

"Automatic Size Control in Finish Grinding"—by W. E. Moody, sales engineer, Bay State Abrasive Products Inc.

2:05 p.m. — Chairman: W. H. Logue, staff engineer, Planning Dept., Caterpillar Tractor Co.

"Precision Production Grinding"

ELECTRICAL EQUIPMENT MANUFACTURERS

clean metal parts in one fast "step" with Vapor Degreasing

For a highly efficient, nonflammable solvent use DU PONT "TRICLENE" D

TRICHLORETHYLENE

In wide use for many years, Du Pont "Triclene" D Trichlorethylene possesses ideal properties for modern metal cleaning. It's stable and pure . . . stands up under moisture, air, heat and other destructive influences. Control and maintenance of degreasing operations are easier because of "Triclene" D's high purity and narrow boiling range. And "Triclene" D is nonflammable for complete safety in use.

"Perclene" perchlorethylene—another Du Pont solvent for vapor degreasing—is particularly suitable for certain operations requiring a higher boiling solvent.

DU PONT TECHNICAL SERVICE

A call to your Du Pont Solvent Distributor will bring prompt, practical advice from experienced technicians in the metal cleaning field. They'll be glad to tell you about "Triclene" D and assist you on metal cleaning problems.

. . . MANUALLY OPERATED

Circuit breaker unit is thoroughly cleaned in less than a minute by vapor degreasing. Equipment is simple and timesaving . . . handles metal parts of all sizes.

. . . CONVEYORIZED

Switch housings emerge clean, warm and dry from vapor degreasing unit. Conveyor system maintains smooth, even flow of housings at high production speed.

Intricate electrical equipment parts, made of all types of metal, are thoroughly cleaned by vapor degreasing with Du Pont "Triclene" D Trichlorethylene. Parts come out clean, warm and dry, instantly ready for inspection, finishing or further fabrication. The heaviest oils and grease are completely removed—usually in less than a minute!

Compact vapor degreasing units require a minimum of floor space and can be adapted to conveyorized or manual operation. Cleaning costs remain low, since contaminated solvent is readily recovered for economical re-use. That's why vapor degreasing is first choice among manufacturers for low-cost, efficient metal cleaning over a wide range of production capacities.

Perhaps vapor degreasing can mean increased efficiency in *your* metal cleaning program. The coupon below will bring you complete information.

Mail the coupon below for more facts on vapor degreasing

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DU PONT *flammable* SOLVENTS for VAPOR DEGREASING

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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Electrochemicals Dept., Wilmington 98, Delaware

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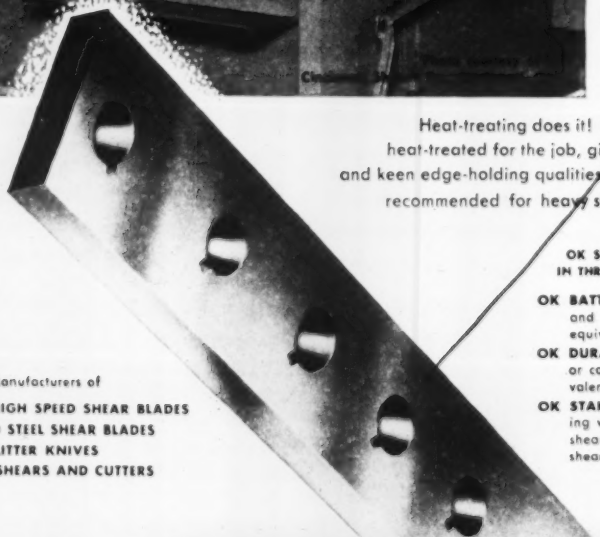
Keep production costs down. Keep your machines running. OK Shear Blades run longer between regrindings . . .

Heat-treating does it! OK Shear Blades are specially heat-treated for the job, giving them maximum toughness and keen edge-holding qualities. OK Shear Blades are highly recommended for heavy shearing and heavy plate work.



OK SHEAR BLADES ARE MADE IN THREE OUTSTANDING GRADES:

OK BATTLE AXE For shearing up to and including ¼" mild steel or equivalent.

OK DURA-CHROME For shearing hot or cold plate up to 1¼" or equivalent.

OK STANDARD For any type of shearing where only short runs or little shearing is done, and heavy plate shearing.

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OK SOLID STEEL SHEAR BLADES
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CINCINNATI 23, OHIO

——by B. H. Work, assistant sales manager Bonded Products & Grain Division, Carborundum Co.

2:50 p.m. — Chairman: Gordon Swardenski, planning & tooling manager, Caterpillar Tractor Co. "Finish Grinding Troubles and Remedies"—by A. W. Todd, assistant chief engineer, Van Norman Co.

3:30 p.m.—Panel Discussion: "Finish Grinding"
Moderator: M. L. Bengtson, vice president, Mercury Engineering Co.

R. N. Bell, technical engineer, Hammond Machinery Builders Inc.; R. A. Cole, vice president, Production Machine Co.; Adam Gabriel, president, Acme Industrial Co.; J. A. Harrington, chief engineer, DoAll Co.; G. M. Lamabe, master mechanic, Chevrolet-Toledo Division, General Motors Corp.; and G. T. Rideout, sales engineer, Norton Co.

Evening Session

8:00 p.m.—Hotel Conrad Hilton 20th Annual Banquet, American Society of Tool Engineers

Speaker: Charles E. Wilson, Defense Mobilization Director

Plant Tours: (Leave at 9:00 a.m. from Hotel Conrad Hilton)
Clearing Machine Co., International Harvester Co., Manufacturing Research Division and Melrose Park plant, Kropp Forge Co., Lindberg Steel Treating Co., Motorola Inc., Scully Jones & Co. and Verson Allsteel Press Co.

Friday, March 21

Machine Accessories, Drives & Control Day

Morning Session (Stockyards Inn)

9:00 a.m.—Chairman: R. E. Beebe, general manager, Winkelmann Co.

"Analysis of Cost Estimating Principles & Practices"—by L. E. Doyle, associate prof. of mechanical engineering, University of Illinois.

9:00 a.m. — Chairman: G. M. Waller, chief engineer, Burgess Norton Mfg. Co.

AMERICAN CHEMICAL PAINT COMPANY
AMBLER PENNA.

Technical Service Data Sheet
Subject: IMPROVED DRAWING AND COLD FORMING WITH GRANODRAW

INTRODUCTION:

When steel is phosphate coated with "Granodraw" prior to working it, drawing, extrusion, and other cold forming operations are greatly improved. In fact, the protective phosphate coating makes the cold extrusion of steel possible.

Getting cold steel to flow depends on the unique properties of this coating. Its non-metallic phosphate crystals are physically and chemically adapted to acquire a strongly adsorbed lubricant. The combination of adherent phosphate coating and adsorbed lubricating film possesses a low coefficient of friction while maintaining its integrity under extremely high deforming pressures.

The drawing of wire and many other cold forming operations — including the cold extrusion of steel — are greatly facilitated by the application of a "Granodraw" phosphate coating and a suitable lubricant prior to working.

"GRANODRAW" DATA

"Granodraw" zinc phosphate coating chemical is applied to pickled surfaces in an immersion or spray process. When used with a suitable lubricant, the coating reduces friction under conditions of low, medium, or high deforming forces encountered in such typical operations as: cold extrusion of steel; cold shaping; deep drawing (tubs, cartridge cases, shells, etc.); stamping; drawing of wire and tubing; ironing; necking; nosing; and upsetting.

ADVANTAGES OF PHOSPHATE COATING WITH "GRANODRAW" PRIOR TO COLD FORMING STEEL

The following are among the advantages indicated for phosphate coating with "Granodraw" prior to cold forming steel:

Drawing of wire, bars, tubing, etc. — Improved lubrication; improved surface; less scratching; reduced pull; greater percent reduction per pass; reduced die wear; longer die life; lower die maintenance and cost; reduction in corrosion.

Drawing of stampings, shells, shell cases, etc. — Improved lubrication; reduced breakage; reduction in scrap; deeper draws; less scratching; elimination of some annealing; less wear on dies.

Cold Extrusion — Improved lubrication; increased strength of parts; improved surface; reduction in load on press; greater dimensional accuracy; more uniform wall thickness; longer extrusions; elimination of some annealing; less corrosion.

CHEMICALS ACP PROCESSES

WRITE FOR FURTHER INFORMATION ON "GRANODRAW" AND ON YOUR OWN METAL PROTECTION PROBLEMS.

CHEMICALS ACP PROCESSES

FOR HIGHEST QUALITY TOOL USE THESE TAILORMADE STERLING

THE STERLING GRINDING
OF THE CLEVELAND

AND CUTTER SHARPENING TOOLROOM WHEELS

The Correct "Wheel of Industry", Designed to Your Particular Job Demands, Saves Time, Temper, and Money . . . Assures Faster, Expert Results Everytime!

● Sterling Toolroom Grinding Wheels readily meet the modern demands of the unusual alloys and other related materials which are a part of today's defense production. Sterling's "Wheels of Industry", because they are tailormade for your difficult jobs, need very little dressing . . . you can use all the time on your jobs for grinding.

Sterling Toolroom Grinding Wheels, manufactured with "drawing-board accuracy", accomplish superior results without danger of chatter or excessive tool wear. They stand up under long runs and, under test, have actually provided many extra hours of grinding at no added cost.

Whatever your problem, there is a Sterling Toolroom Grinding Wheel that will readily solve it. Sterling engineers, skilled in modern toolroom grinding, stand ready to suggest the "Wheels of Industry" you need. Ask for the services of these specialists . . . there is no cost or obligation.

BEST IN THE TEST—THAT'S STERLING!

● In a recent test, held at a well known tool and die company, a Sterling 10 x ½ x 2 grinding wheel, specification ZA46 H14 V2, was tested on a general purpose, surfacing operation in competition with other brand abrasive units. The Sterling "Wheel of Industry" quickly established its superiority by outperforming the other wheels in every way—cut freer, cooler, and quicker.

Such splendid results indicate what can be expected from Sterling Toolroom Grinding Wheels on your jobs. Special wheel specifications, built to your particular needs, are available on short notice. Tell us about your problems. We will gladly offer quick solutions—a letter from you will receive our immediate attention.

Ask for These STERLING Research and Development Folders - - -

● The many demands for faster, better grinding make these folders important for any one concerned with pushing up today's production curve. This literature gives many suggestions for doing better jobs of sharpening, roughing or finishing and are a welcome supplement to the advice given by Sterling engineers. The popular fifth edition of "The Art and Science of Grinding" is included. A request on your company letterhead will bring the entire series at once.

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COMPACT, FAST TRAVELING
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SWING-BOOM
MOBILE CRANE
CAN SWING IT!
SWINGS AND TRANSPORTS LOADS OF ANY SHAPE OR SIZE ANYWHERE IN YOUR PLANT

1½, 2½, 5 and 10 ton cap.

You don't have to face the load . . . swing the boom! It's live and handles up to 10 tons at either side. You can swing materials from a RR car right onto a waiting truck; reach into a boxcar and load it; stack piles two-deep and three-deep on both sides of aisle, increasing storage space; move loads into plant through low shop doors; work in narrow aisles and congested areas where other equipment cannot operate.

Only ***KRANE KAR*** can do such difficult materials-handling jobs *ECONOMICALLY* because 1—it transports full rated load; 2—tops and lowers boom by power; 3—lowers load by power; 4—has automatic crane braking at limit positions; 5—has good vision; 6—excellent traction and short turning radius; 7—gas-powered, it can work 24 hours a day.

Use ***KRANE KAR*** as a standby for bigger cranes and for emergency maintenance and repairs. *ASK FOR BULL. 89—STEEL, Metalworking and Metalproducing Industries.*

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"Power Chucking"—by H. L. Stewart, assistant sales manager, Logansport Machine Co.

9:00 a.m.—Chairman: S. R. Cope, president, Acme School of Design Engineering
"Practical Aspects of Tool & Die Heat Treatment"—by E. J. Pavesic, research director, Lindberg Steel Treating Co.

Afternoon Session
(Stockyards Inn)

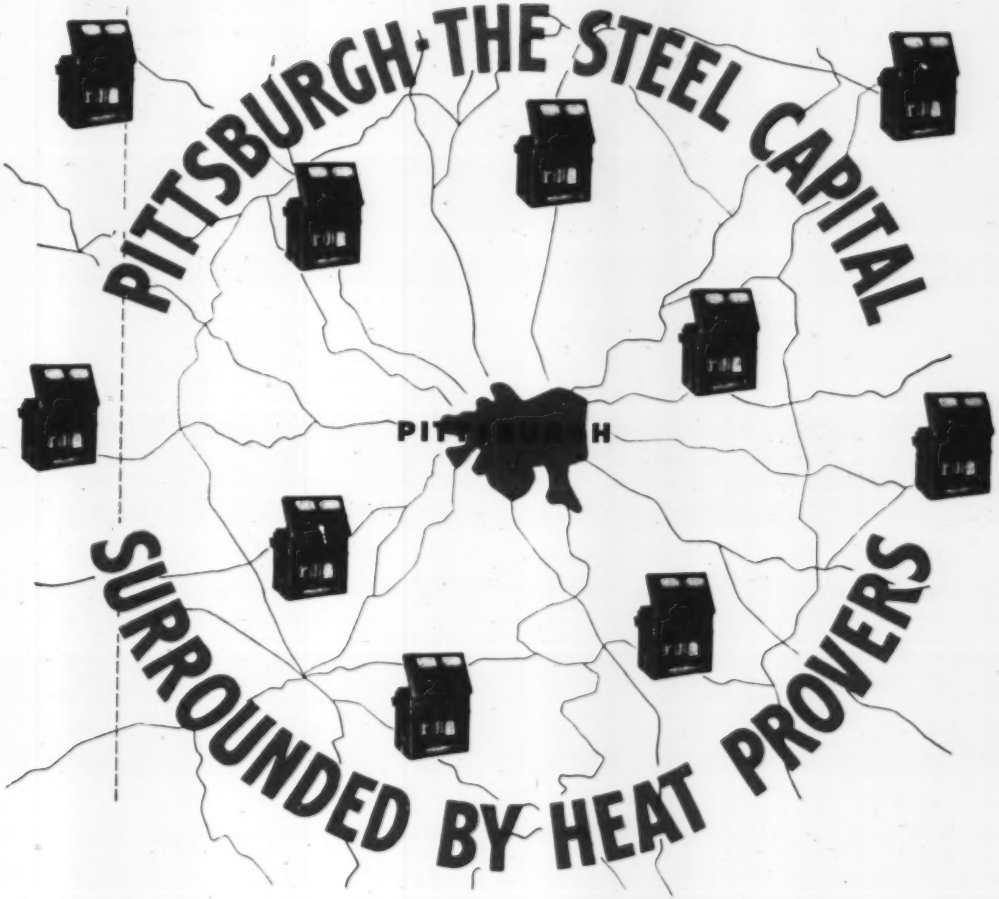
1:30 p.m.—Chairman: J. C. Yoder, foreman, Martin Machine Co. Inc.
"Electronics in Motor Drives"—by E. H. Vedder, manager, industrial electronics control engineering, Westinghouse Electric Corp.

2:05 p.m.—Chairman: B. J. Phillips, owner, Phillips Auto Parts
"Pneumatic or Hydraulic Drives"—by J. C. Hanna, vice president & chief engineer, Hanna Engineering Works.

2:50 p.m.—Chairman: H. J. Braun, sales engineer, Foote Bros. Gear & Machine Co.
"Mechanical Variable Speed Drives"—H. G. Keller, assistant chief engineer, Link-Belt Co.

3:30 p.m.—Panel Discussion: "Machine Drives and Controls."
Moderator: R. O. Knudson, Special Machine Tool Dept., Greenlee Bros. & Co.
K. H. Casson, chief engineer, Barnes Drill Co.; D. B. Enyeart, design engineer, Monarch Machine Tool Co.; O. J. Maha, vice president & chief engineer, Hennifin Corp.; R. W. Pashby, assistant to vice president, charge of engineering & research, Micro Switch Division; B. J. Nelson, chief engineer, Foote Bros. Gear & Machine Corp. and R. J. Owen, chief application engineer, Louis Allis Co.

Plant Tours: (Leave at 9:00 a.m. from Hotel Conrad Hilton) Aircraft Engine Division, Ford Motor Co., Clearing Machine Co., International Harvester Co., Manufacturing Research Division and Melrose Park plant, International Harvester Co., Lindbergh Steel Treating Co., Scully Jones & Co., Thor Corp. and Verson Allsteel Press Co.



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It takes the Heat Prover to read simultaneously for oxygen and combustibles, measured direct by actual gas analysis. And the Heat Prover's continuous rapid sampling reveals effects of furnace adjustments at once. The Heat Prover frees you of maintenance too, because it's *not an instrument you buy, but a Service we supply*. Learn how it can raise productivity for you . . . in iron, steel, ceramics, glass, cement or any other furnace operation. Write CITIES SERVICE OIL COMPANY, Dept. C24, Sixty Wall Tower, New York City 5.

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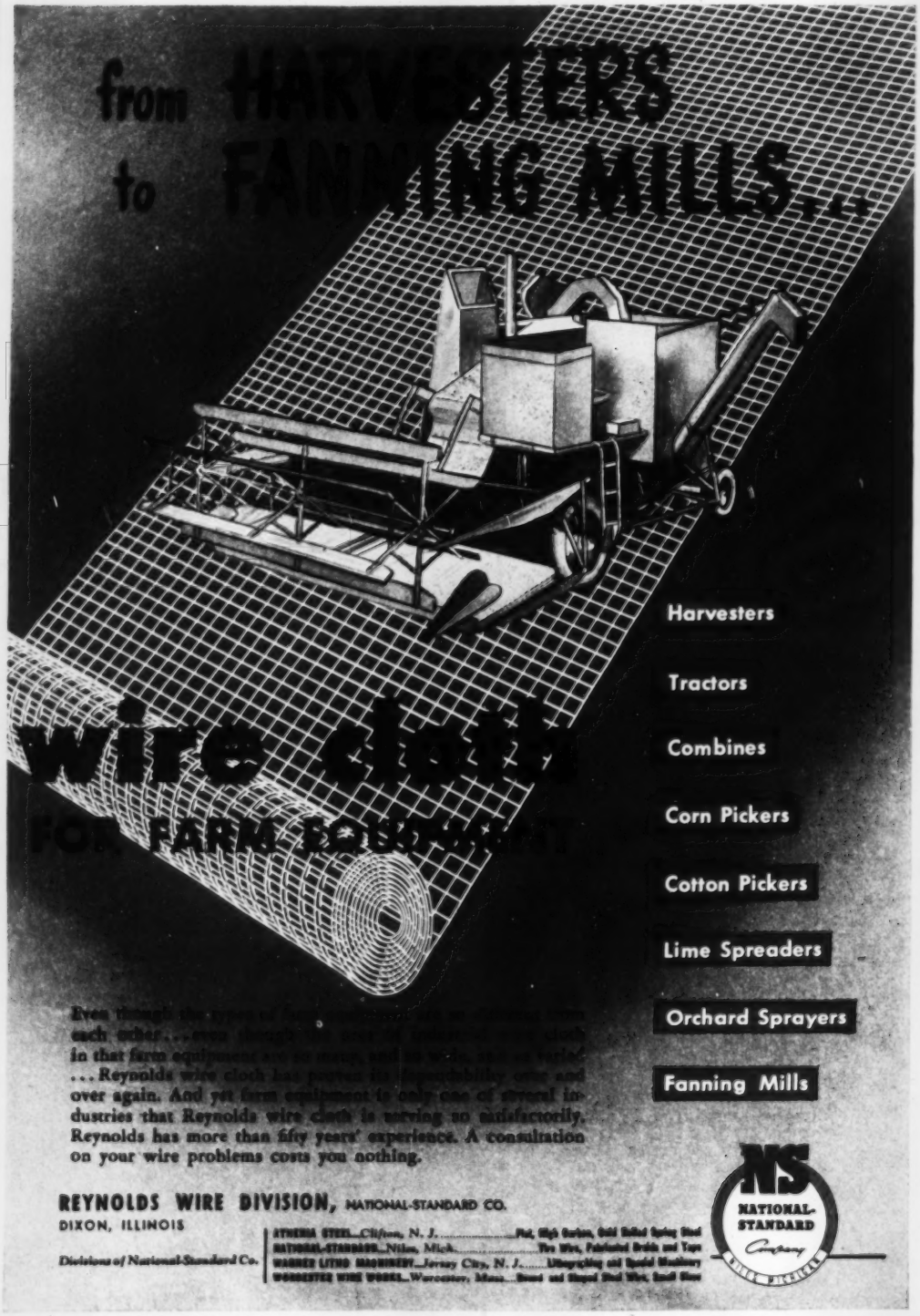
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Tractors
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Lime Spreaders
Orchard Sprayers
Fanning Mills
Even though the types of farm equipment are so different from each other... even though the uses of industrial wire cloth in that farm equipment are so many, and so wide, and so varied ... Reynolds wire cloth has proven its dependability over and over again. And yet farm equipment is only one of several industries that Reynolds wire cloth is serving so satisfactorily. Reynolds has more than fifty years' experience. A consultation on your wire problems costs you nothing.
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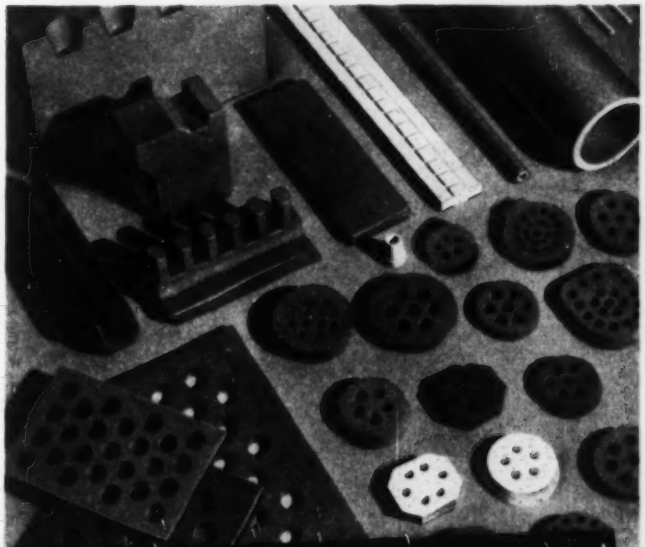
DIXON, ILLINOIS
Divisions of National-Standard Co.
ATHENIA STEEL...Clifton, N. J. ... Flat, High Carbon, Cold Rolled Spring Steel
NATIONAL-STANDARD...Niles, Mich. ... Tire Wire, Fabricated Braids and Tape
WAGNER LITHO MACHINERY...Jersey City, N. J. ... Lithographing and Special Machinery
WORCESTER WIRE WORKS...Worcester, Mass. ... Round and Shaped Steel Wire, Small Sizes
NS NATIONAL-STANDARD Company NILES MICHIGAN

ASTE Exhibitors

(Concluded from Page 116)

COMPANY	BOOTH
Hansford Mfg. Corp., Rochester, N. Y.	150
Hanson-Whitney Co., Hartford, Conn.	829
Hardinge Bros. Inc., Elmira, N. Y.	1516
R. G. Haskins Co., Chicago	333
Haynes Stellite Division, Union Carbide & Carbon Corp., New York	1122
Heintz Mfg. Co., Philadelphia	424
Heli-Coil Corp., Danbury, Conn.	316
Henry & Wright, Hartford, Conn.	1325
Herman Stone Co., Dayton, O.	814
Hercules Presses Ltd., Toronto	1031
Heston & Anderson, division of St. Paul Foundry and Mfg. Co., Fairfield, Iowa	430
Hitchcock Publishing Co., Machine & Tool Blue Book, Wheaton, Ill.	418
Alfred Hofmann Needle Works Inc., W. New York, N. J.	1715
Honan-Crane Corp., Lebanon, Ind.	1716
Huebner Publications Inc., Cleveland	339
Hydroway Scales Inc., Detroit	108
Ideal Industries Inc., Sycamore, Ill.	642
Illinois Tool Works, Chicago	1223
Index Machine Co., Jackson, Mich.	148
Industrial Tectonics Inc., Ann Arbor, Mich.	315
Ingersoll-Rand Co., New York	1639
International Harvester Co., Mfg. Research Department, Chicago	615
The Iron Age, New York	800
J & S Tool Co. Inc., E. Orange, N. J.	1922
Janney Cylinder Co., Philadelphia	324
Charles L. Jarvis Co., Middletown, Conn.	1534
J. G. Jergens Co., Cleveland	743
Jergens Tool Specialty Co., Cleveland	350
C. E. Johansson Gage Co., Detroit	701
Johansson & Windle Co., Skokie, Ill.	1840
Eric S. Johnson Co., Chicago	111
Johnson Gage Co., Bloomfield, Conn.	817
S. C. Johnson & Son Inc., Racine, Wis.	104
Jones & Lamson Machine Co., Springfield, Vt.	1411
Kalamazoo Tank & Silo Co., Machine Tool Division, Kalamazoo, Mich.	1023
Kaufman Mfg. Co., Manitowoc, Wis.	1926
Kelvin Systems Corp., S. Norwalk, Conn.	2050
Kennametal Inc., Latrobe, Pa.	1723
Klingelhofer Machine Tool Co., Westfield, N. J.	2000
Kurfund Co. Inc., Long Island City, N. Y.	1011
Landis Machine Co., Waynesboro, Pa.	1918
Lapeer Mfg. Co., Lapeer, Mich.	325
Last Word Sales Co., Detroit	438
Latrobe Electric Steel Co., Latrobe, Pa.	1732
K. O. Lee Co., Aberdeen, S. Dakota	347
Lees-Bradner Co., Cleveland	2030
Lindberg Engineering Co., Chicago	1333
Lipe-Rollway Corp., Syracuse, N. Y.	1525
F. J. Littell Machine, Chicago	2013
Logan Engineering Co., Chicago	1130
Logansport Machine Co. Inc., Logansport, Ind.	1529
Lovejoy Tool Co. Inc., Springfield, Vt.	1009
Lufkin Rule Co., Saginaw, Mich.	809
M-B Products, Detroit	1217
M. B. I. Export & Import Ltd., New York	2025
Industrial Press, New York	846
Magna Engineering Corp., Menlo Park, Calif.	308
Macklin Co., Jackson, Mich.	841
Magnaflux Corp., Chicago 501 and	1117
Manhattan Rubber Division, Raybestos-Manhattan Inc., Passaic, N. J.	441
Martindale Electric Co., Cleveland	1212
Marvin Machine Products Inc., Detroit	1021
Master Mfg. Co., Hutchinson, Kans.	205
Masterform Tool Co., Chicago	109
Jas. H. Matthews & Co., Pittsburgh	1318
McCaskey Register Co., Alliance, O.	505
McCrosky Tool Corp., Meadville, Pa.	1227
Mechanical Air Controls, Royal Oak, Mich.	2012
Merz Engineering Inc., Indianapolis	804



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Precision made for your requirements. For holding work during brazing, soldering, electronic heating. Superior resistance to repeated hot-cold shock. Proper jigs, templates or other work holding devices can speed your operations many times over. Outline your problems and let us make recommendations.

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Can be furnished to exact dimensions for precision castings. Also economical and accurate method of forming many small area holes in castings.

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Used in the riser to form a weak joint between riser and casting. Reduces cut-off time. In many cases riser can be knocked off instead of cut off. A great time and money saver. Can be made to your specifications. Cameron Cores, Patent No. 2313517, sold to Meehanite Licensees only.

GATE TUBES

Used in casting to convey molten metal into casting without contamination.

TROUGHS

For conveying molten metals. Custom made.

STRAINER CORES

These ceramic cores fit into gate of mold, strain the metal, regulate its flow. Cleaner castings, fewer rejects. Money saver. Made in two materials:

ALSIMAG 564 (WHITE) is less expensive, gives perfect performance with lower melting point metals such as cast iron. Adequate for some cast steel applications but test this material on steel applications before adopting it as standard. Has heat resistance above that of many materials recommended for use with cast steel but we are on the conservative side.

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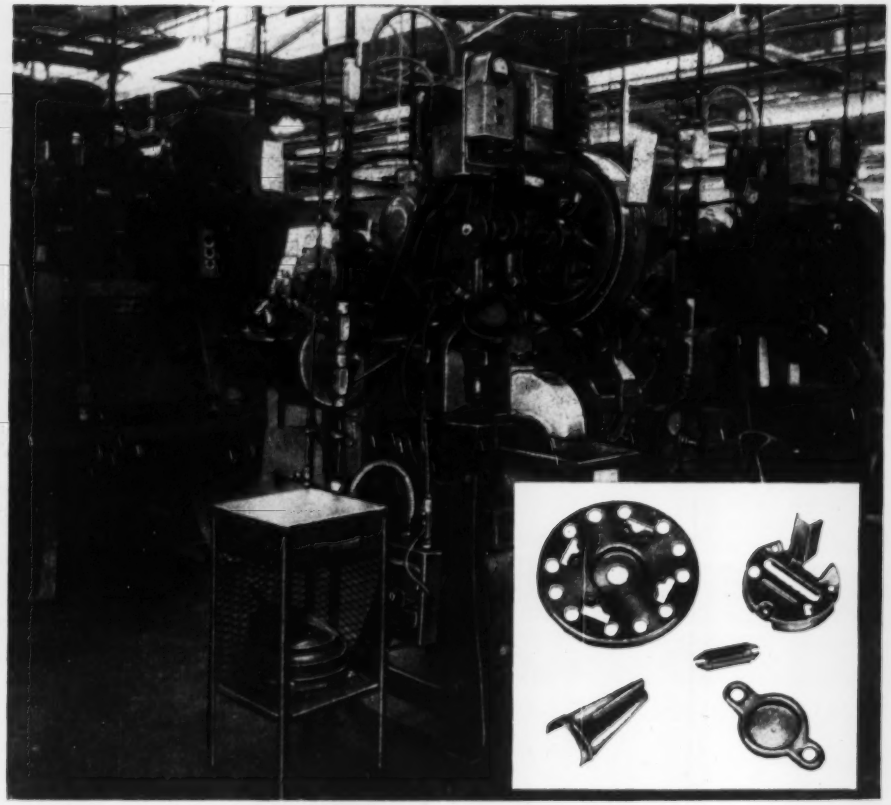
Close Tolerances Held



V & O Presses at Sylvania Electric Products, Inc., are used to fabricate small, light parts for radio tube manufacture and heavier parts in television picture tubes, radio and television sets and various other components. Runs on some of these parts are as high as 10,000,000 pieces. Extremely close tolerances are being held for certain parts over these large quantities. "Without a press that could be relied upon," reports Sylvania, "such figures as those noted could not be continued day by day, and year by year."

OTHER EMHART PRODUCTS INCLUDE:

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PLASTIC BOTTLES, RODS, TUBES, SPECIAL SHAPES
PLAX CORPORATION
Subsidiary of Emhart Mfg. Co.
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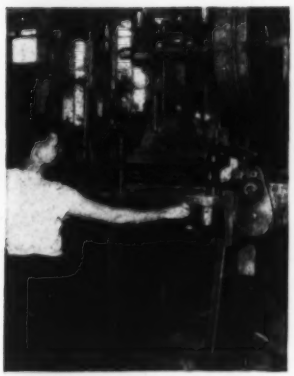
on runs of millions of pieces

One Hundred V & O Presses are operated by Royal Typewriter Co. for continuous production of numerous parts, such as top covers, key levers and base frames for portable typewriters. Operations performed on V & O Presses range from blanking to precision forming.



Assembly of Coils on the Room Air Conditioner production line at York Corporation is accomplished automatically on specially designed V & O Presses. This machine first feeds a roll of copper through rolls which corrugate fins, then to a die which punches, flares, curls and cuts off individual fins. Machine then stacks fins on copper tubes.

Production increases in secondary die operations of 50%-100% are obtained with the V & O Feed-O-Matic.® This unique punch press feeder not only speeds output — it increases die life and minimizes operator fatigue. Operator's hands are never under punch. Feed-O-Matic delivers piece to die and automatically trips press. Can be used with any make of press.

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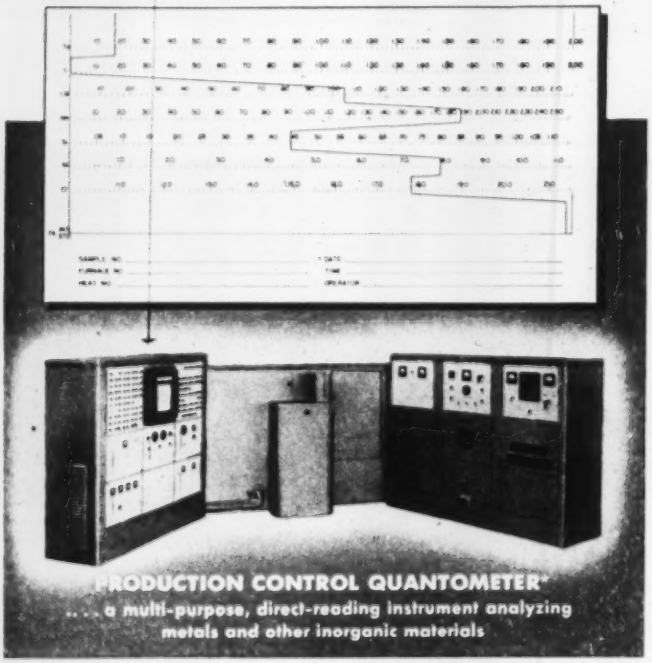
BOOTH 1331

DESCRIPTIVE CATALOGS Catalogs containing complete specifications and operating details on V & O Precision Power Presses and Feeds are available. Please write The V & O Press Company, 381 Union Turnpike, Hudson, N. Y.

THE V & O PRESS COMPANY
Division of Emhart Mfg. Co.
BUILDERS OF PRECISION POWER PRESSES AND FEEDS SINCE 1889
HUDSON NEW YORK

THE INSIDE STORY ON STAINLESS STEEL

Shown below is a multiple-copy graphic record of a typical stainless steel chemical analysis made on an ARL Production Control Quantometer.* Accurate percentages of elements present in the alloy are recorded permanently in pen-and-ink in less than two minutes! And steel is only one of many metals and inorganic compounds which the unique ARL Quantometers are controlling daily as to routine chemical analysis in many types of industries.



PRODUCTION CONTROL QUANTOMETER* ... a multi-purpose, direct-reading instrument analyzing metals and other inorganic materials

The ARL Quantometer is extremely efficient, versatile and applicable to a wide variety of needs. Individual units are not limited to a single type of analysis, but can be designed to meet the requirements of many plant problems. As many as 25 elements as selected by the user can be accurately measured on the Production Control Quantometer—up to 20 simultaneously!

This instrument, pioneered and perfected by ARL engineers, is invaluable in helping to speed the production of critical materials and improving laboratory controls. It is the most advanced type of spectrometer yet developed and deserves your most serious consideration. Write for descriptive brochure.

THE ARL LINE ALSO INCLUDES 1.5 AND 2-METER SPECTROGRAPHS, PRECISION SOURCE UNITS, RAMAN SPECTROGRAPHS AND RELATED ACCESSORIES.

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COMPANY	BOOTH
Metal Carbides Corp., Youngstown	739
Metal Cutting Tools Inc., Rockford, Ill.	200
Metal Lubricants Co., Chicago	1811
Metal Removal Co., Chicago	535
Metro Tool & Gage Co., Chicago	734
W. F. Meyers Co. Inc., Bedford, Ind.	1826
Michigan Tool Co., Detroit	1200
Micro-Poise Engineering & Sales Co., Detroit	818
Micro-Lathe-Plate, Inc., Cleveland	309
Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.	416
Micrometrical Mfg. Co., Ann Arbor, Mich.	732
Milford Rivet & Machine Co., Milford, Conn.	2004
Miller Motor Co., Melrose Park, Ill.	1731
A. Milne & Co., New York	120
Modern Industrial Engineering Co., Detroit	412
Modern Machine Shop, Gardner Publications Inc., Cincinnati, O.	651
Modernair Corp., San Leandro, Calif.	1843
S. A. Mondiale, Vilvorde, Belgium	1030
Moore Products Co., Philadelphia	824
Morey Machinery Co. Inc., New York	1250
Morton Machine Works, Ferndale, Mich.	1015
National Broach & Machine Co., Detroit	1022
National Machine Tool Co., Racine, Wis.	232
National Tool Co., Cleveland	1815
Nelco Tool Co. Inc., Manchester, Conn.	410
New Hermes Engraving Machine Corp., New York	239
Niagara Machine & Tool Works, Buffalo, N. Y.	1313
Nichols-Morris Corp., New York	1624
Nicholson File Co., Providence, R. I.	745
Nilsson Gage Co. Inc., Poughkeepsie, N. Y.	533
Nord International Corp., Denville, N. J.	124
C. A. Norgren Co., Englewood, Colo.	1931
Norton Co., Worcester, Mass.	1039
O. K. Tool Co., Milford, N. H.	1420
Oakite Products Inc., New York	132
Ohio Crankshaft Co., Tocco Division, Cleveland	1425
O'Neil-Irwin Mfg. Co., Lake City, Minn.	1338
Kurt Orban Inc., New York	1000
Ortman-Miller Machine Co. Inc., Hammond, Ind.	2017
Osborn Mfg. Co., Cleveland	1838
O'Vee Spring Gage Co., Los Angeles	734
Pangborn Corp., Hagerstown, Md.	1322
Parker Rust Proof Co., Detroit	247
Parkwood Laminates Inc., Wakefield, Mass.	238
Penton Publishing Co., Cleveland	546
Perfex Gage & Tool Co., Mt. Clemens, Mich.	810
Perrish Steel Products Inc., Los Angeles	1034
Pines Engineering Co., Aurora, Ill.	301
Pioneer Pump & Mfg. Co., Detroit	1528
Pioneer Tool & Engineering Co., Chicago	547
Pivot Punch & Dye Corp., N. Tonawanda, N. Y.	343
Porter Precision Products, Cincinnati	1830
Pratt & Whitney Division, Niles-Bement-Pond Co., W. Hartford, Conn.	512
Precise Products Co., Racine, Wis.	1005
Precision Detroit Co., Detroit	1713
Precision Diamond Tool Co., Elgin, Ill.	313
Precision Grinding Wheel Co., Philadelphia	340
Procunier Safety Chuck Co., Chicago	336
Production Machine Co., Greenfield, Mass.	2008
Producto Machine Co., Bridgeport, Conn.	1104
Progressive Welder Sales Co., Detroit	437
Putnam Tool Co., Detroit	439
R and L Tools, Philadelphia	408
Rahn Granite Surface Plate Co., Dayton, O.	603
Racine Tool & Machine Co., Racine, Wis.	432
Ready Tool Co., Bridgeport, Conn.	1017
Republic Gage Co., Detroit	519

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Check these production-boosting design features.

HIGH SPEED—without sacrificing quality. Nut blanks need no subsequent operation except threading.

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We're always pioneering . . . we started over 100 years ago on March 5, 1851. When we stop pioneering, we stop (period). In this ad you'll find evidence that we're going ahead, into our second century.

NEW CUT-OFF DEVICE—of ingenious design.

SIMPLIFIED TRANSFER MECHANISM—with locking device for position.

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BLANK INVERTER—for work that must be turned over during sequence of operations.

Write, wire or phone for further information.

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Bayflex® Disc-Wheels

CUTTING ACTION . . . fast and smooth. Has enough resiliency to hug the work. Capable of rough cutting as well as blending.

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TECHNIQUE OF USE . . . Apply to work at an angle of approximately 35° using the weight of the machine for pressure. Maintain full speed for most efficient operation.

OTHER APPLICATIONS . . . Weld removal on angle iron, pipe, or other structural steel. Mill scale removal. Chamfering metal preparatory to welding. Smoothing down flame cut edges. Light snagging, deburring, blending and finishing soft, non-ferrous materials.

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Rough grind and finish where required with a single Bayflex disc-wheel in a fraction of the time . . . EASIER . . . SAFER . . . MORE ECONOMICAL.

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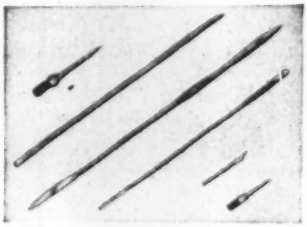

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J. A. Richards Co., Kalamazoo, Mich.	421
Rivett Lathe & Grinder Inc., Boston	1027
Ross Operating Valve Co., Detroit	2026
H. B. Rouse & Co., Chicago	1938
Royal Oak Tool & Machine Co., D-S Grinder Division, Royal Oak, Mich.	1101
Joseph T. Ryerson & Son Inc., Chicago	147
S & S Machinery Co., Brooklyn, N. Y.	1050
Sales Service Machine Tool Co., St. Paul	1621
Salvo Tool & Engineering Co., Roseville, Mich.	352
George Scherr Co. Inc., New York	601
A. Schrader's Son, division Scovill Mfg. Co., Brooklyn, N. Y.	433
Schramm Inc., W. Chester, Pa.	1319
Scully-Jones & Co., Chicago	1511
Seibert & Sons Inc., E. Peoria, Ill.	440
Sentry Co., Foxboro, Mass.	1930
Service Diamond Tool Co., Ferndale, Mich.	719
Service Machine Co., Chicago	1804
Severance Tool Industries Inc., Saginaw, Mich.	414
Sheffield Corp., Dayton, O.	710
Sheldon Machine Co., Chicago	1408
Shell Oil Co., New York	112
Simonds Abrasive Co. and Simonds Saw & Steel Co., Philadelphia and Fitchburg, Mass.	1314
Size Control Co., Chicago	704
Socony Vacuum Oil Co., New York	233
South Bend Lathe Works, South Bend, Ind.	1216
Special Engineering Service Inc., Detroit	1142
Standard Electrical Tool Co., Cincinnati	1727
Standard Gage Co. Inc., Poughkeepsie, N. Y.	532
Standard Pressed Steel Co., Jenkintown, Pa.	1535
Staples Tool Co., Cincinnati	639
L. S. Starrett Co., Athol, Mass.	833
Steel City Testing Machines Inc., Detroit	611
Steelcraft Tool Co., Detroit	1102
Steel Products Engineering Co., Springfield, O.	1900
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, O.	1839
Edwin B. Stimpson Co. Inc., Brooklyn, N. Y.	1139
Stokerunit Corp., Milwaukee	508
Stokvis, Edera & Co. Inc., New York	1028
Stone Machinery Co. Inc., Manlius, N. Y.	447
Strong, Carlisle & Hammond Co., Mac It Products Division, Cleveland	844
D. A. Stuart Oil Co. Ltd., Chicago	1823
Sub-Zero Products Mfg. Division, Deepfreeze Distributing Corp., Cincinnati	337
Sunnen Products Co., St. Louis	1724
Super Tool Co., Detroit	1429
Superdraulic Corp., Detroit	849
Sutton Tool Co., Sturgis, Mich.	420
Swedish Gage Co. of America, Detroit	701
Taft-Peirce Mfg. Co., Woonsocket, R. I.	624
Texas Co., New York	246
Thomas Flexible Coupling Co., Warren, Pa.	451
Tomkins-Johnson Co., Jackson, Mich.	1927
The Tool Engineer, Detroit	500
Torit Mfg. Co., St. Paul	242
Tri-State Machinery Co., Pittsburgh	1912
Tubular Micrometer Co., St. James, Minn.	707
Tubular Rivet & Stud Co., Wollaston, Mass.	317
Turner Bros., Ferndale, Mich.	1316
Tuthill Pump Co., Chicago	2029
Union Mfg. Co., New Britain, Conn.	1013
Universal Cyclops Corp., Bridgeville, Pa.	520
Univertical Machine Co., Detroit	442
Utica Drop Forge & Tool Corp., Utica, N. Y.	221

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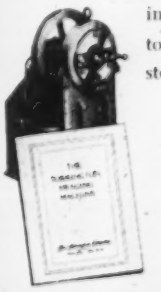

"The Torrington Swaging Machine" tells the story on the art of swaging, and describes the complete line of Torrington machines. This informative booklet is yours for the asking.

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Makers of
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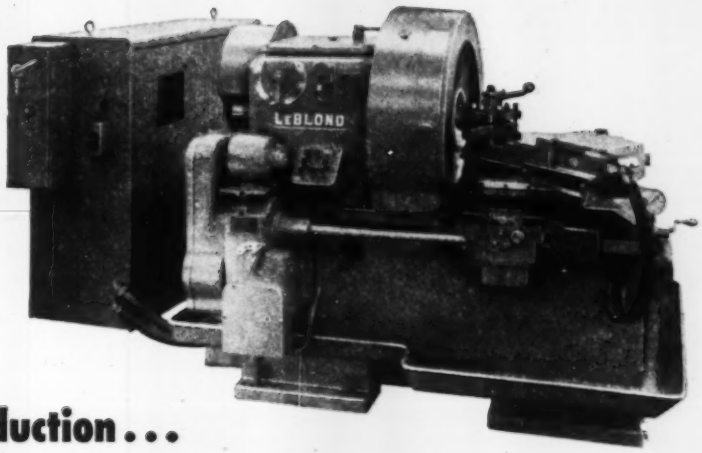

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Flexible, with ready accessibility for changeover from one disc to another.

For either steel or aluminum.

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Vanadium-Alloys Steel Co., Latrobe, Pa.	536
Vapor Blast Mfg. Co., Milwaukee 1210 &	1317
Verso-Mil Co., New York	1942
Verson Allsteel Press, Chicago	2031
Viking Industries, Rockford, Ill.	1208
Viking Tool Co., Shelton, Conn.	650
Vlier Mfg. Co., Los Angeles	321
Vonnegut Moulder Corp., Indianapolis	400
M. Paul Wahlund Mechanical Laboratory, Grant, Iowa	543
Waldes Kohinoor Inc., Long Island City, N. Y.	751
Wales-Strippit Corp., Tonawanda, N. Y.	1412
Walker-Turner Division, Kearney & Trecker Corp., Plainfield, N. J.	1905
Ward Leonard Electric Co., Industrial Chrome Division, Chicago	139
Warner Div., Clinton Mach. Co., Detroit	550
Waukesha Tool Co., Waukesha, Wis.	643
Weatherhead Co., Cleveland	351
Webber Appliance Co. Inc., Indianapolis	241
Webber Gage Co., Cleveland	705
Weldon Tool Co., Cleveland	305
Wesson Co., Ferndale, Mich.	646
West Point Mfg. Co., Farmington, Mich.	240
Wetmore Reamer Co., Milwaukee	747
Westinghouse Air Brake Co., Industrial Products Division, Wilmerding, Pa.	1016
Wickman Mfg. Co., Detroit	1105
Wiedeman Machine Co., Philadelphia	1915
Willey's Carbide Tool Co., Detroit	635
Wilson Mechanical Instrument Division, American Chain & Cable Co. Inc., New York	1126
Wilton Tool Mfg. Co., Chicago	237
Winter Engineering Corp., Buffalo, N. Y.	840
N. A. Woodworth Co., Detroit	1323

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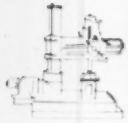

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Steel Brittleness Studied

Nitrogen present as aluminum nitrides improves low temperature notch toughness

INVESTIGATION by the National Bureau of Standards provides valuable information on the effect of nitrogen on the brittleness of certain carbon steels at low temperatures. Results of fracturing V-notch specimens in Charpy impact tests indicate that increased nitrogen, if present as aluminum nitride, improves the low-temperature notch-toughness—lowers the temperature at which brittleness appears—in the steels studied. But nitrogen in the form of nitrides of iron or manganese is apparently detrimental from this standpoint.

Various aspects of the influence of temperature on metals have been studied at NBS for a number of years. Besides its theoretical value, knowledge of the behavior of metals at low temperatures has come to have increasing practical importance. Most ferrous metals, including ordinary carbon and low-alloy steels, tend to become brittle below certain low transition temperatures.

Cold Affected—Many steels that are satisfactory at ordinary temperatures may thus present serious fracture hazards under very cold operating conditions. Low-temperature characteristics of metals may become particularly important in aircraft operating at high altitudes or in cold climates, in military vehicles and equipment for arctic use and in refrigerating equipment.

This low-temperature increase in brittleness, or loss of toughness, is generally accompanied by a decrease in ductility, by a decrease in energy absorbed in fracturing, and by a change in appearance of the fracture surface. This surface is fibrous in appearance in higher-temperature fractures but becomes granular in fractures occurring at lower temperatures. Transition temperatures depend on many factors, including chemical composition, the manufacturing process, subsequent thermal and mechanical treatment, and method of applying stress. Even if it is not introduced intentionally, a certain

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ENGINE PARTS

Pratt & Whitney Aircraft uses Udylite equipment to provide tough, durable finishes for vital aircraft engine parts. Their vast plating department contains row upon row of dependable Udylite Rectoplaters, banks of Udylite Rheostats and batteries of Udylite Semi-Automatic Plating Machines.

Processes range from chrome to cadmium plating; parts include combustion chamber liners, turbine shafts and many other smaller units requiring various surface finishes. Proof of the effectiveness of the long-wearing protective finishes applied with Udylite equipment is found in the fact that Pratt & Whitney's J-42 Turbo-Wasp jet engines are flying 1,000 hours between overhauls.

Udylite electrical equipment and plating machines in your metal finishing operations can give your products the same wear-defying durability. Call in your Udylite Technical Man today and have him show you the Udylite short-cuts to better plating, anodizing, carburizing, blackening or any other process of either a special or standard nature. There's no obligation.

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WHY NOT
cast a magnesium mousetrap?

Maybe it IS a lousy idea

On the other hand, maybe it's as practical as using cheese for bait.

Frankly, we haven't gotten out a slide rule or put our thinking cap on tight, to figure it out one way or the other. Maybe the mice wouldn't go for it.

But we do know a lot of things WILL be cast in magnesium or aluminum after military requirements are satisfied.

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So whatever your plans are; whatever directions they might take; whatever products you might have on scraps of paper, in preliminary drawings, or just plain ideas-on-the-brain . . . keep an open mind in terms of magnesium or aluminum in sand cast, semi-permanent or permanent mold form.

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amount of nitrogen normally finds its way into steel in the course of manufacture. Knowledge of the effect of nitrogen on low-temperature brittleness, as well as on other steel characteristics, therefore becomes important.

Test Specimens — The samples studied at NBS were of 0.3-per cent carbon steels and containing 0.9 or 1.6 per cent manganese, 0.2 to 0.3 per cent silicon, and variable nitrogen. Included was one aluminum-treated series. Notched specimens were fractured in impact at temperatures ranging from −196° to 100°C (−320° to 212°F). The aluminum-treated steels tested showed much better low-temperature notch-toughness than the steels not so treated. Transition temperatures, at which behavior changed from ductile to brittle, were approximately 30° to 50°C lower for the aluminum-treated specimens. Transition temperatures ranged from about −45° or −50°C for the nonaluminum-treated steels to about −80° or −95°C for the aluminum-treated steels. In the latter the nitrogen was present as aluminum nitride, and transition temperatures decreased with increasing aluminum nitride content.

Reported findings by various past investigators of the effect of nitrogen content on low-temperature properties of steels have been inconsistent. Some investigators have reported decreased toughness and higher transition temperatures with increased nitrogen, while others have reported no appreciable effect. Other researchers have suggested that nitrogen may be beneficial if present in the form of aluminum nitride. The new NBS study, indicating that nitrogen is beneficial to low-temperature notch toughness if present as aluminum nitride but detrimental if in the form of other nitrides, tends to explain and reconcile the inconsistent earlier reports.

Manual Treats Welder Upkeep

Handbook devoted exclusively to maintenance of stud welding equipment is published by KSM Products Inc. Designed for quick, convenient reference by maintenance men, the 12-page manual has eight drawings and charts, plus

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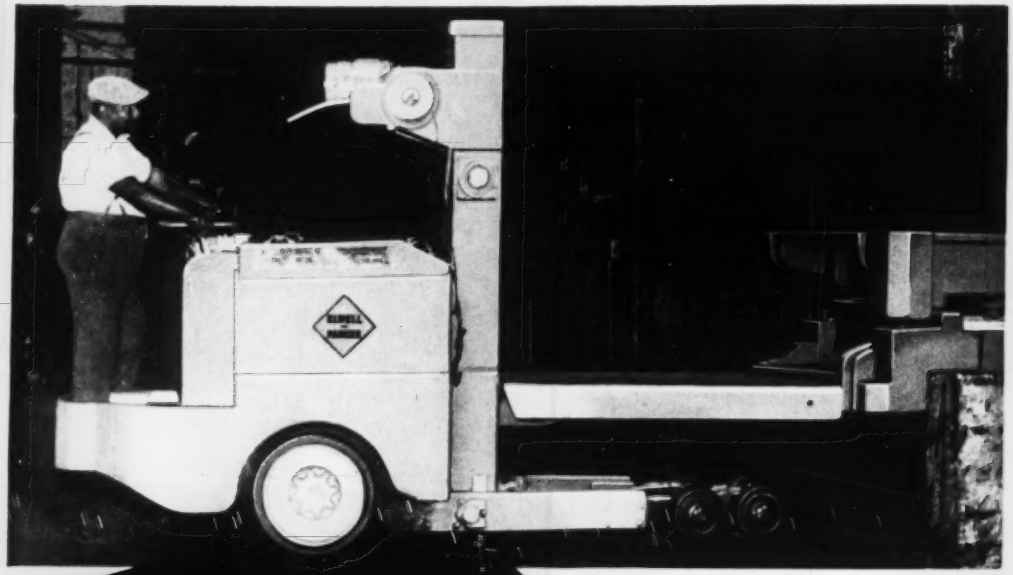

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One of America's leading auto body manufacturers uses over 100 industrial power trucks —more than half being Elwell-Parkers. But for their really rugged operation—moving multi-ton stamping dies—they rely on E-P die handler trucks.

Dies weighing up to 25 tons are placed on presses, pulled off and carried to and from storage by the Elwell-Parkers. Changeovers require only a few minutes. Fast work is essential to keep costly press idle time at a minimum.

Overloading of die trucks is frequent—almost the rule. Sometimes dies are "bumped" into position on the press bed. In such cases, the operator rams the truck's platform against the die to push it into position. Strain on truck is tremendous, but Elwell-Parkers can take it.

Dependable service under such gruelling work demonstrates E-P quality—explains why Elwell-Parkers are assigned the tough jobs in mixed fleets. For advice about your specific needs, request Elwell-Parker's *Industrial Logistics Service.* Write The Elwell-Parker Electric Co., 4102 St. Clair Ave., Cleveland 3, Ohio.

Heavy dies required for fine finished product.

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POWER INDUSTRIAL TRUCKS
Established 1893

NEW General Catalog

describes the complete E-P line in detail. Write for it NOW. Also ask for special booklet on die handling trucks.

12 photographs to illustrate specific components and problems. Material is divided into three basic sections: General, maintenance and accessories. Copies are available from the company's Stud Welding Division, Merchantville, N. Y.

ASME Talks Conservation

Conservation from every angle —materials, manpower, time—will be presented to aid industry men at next week's annual conference of the Pittsburgh section, American Society of Mechanical Engineers. The society expects about 500 to attend the sessions Tuesday and Wednesday at the William Penn Hotel, Pittsburgh.

Opening the program Wednesday, a panel will discuss "Strategic Materials, Their Conservation or the Use of Alternates." G. A. Shoemaker, vice president, Pittsburgh Consolidation Coal Co., is chairman. In the afternoon, H. E. Longenecker, dean of the University of Pittsburgh's Graduate School, heads a discussion of "Technical Manpower in the Years Ahead." Speaker named for the evening banquet session is Phillip M. McKenna, president, Kennametal Inc., Latrobe, Pa.

On Tuesday morning, the broad topic titled "Increasing Productivity" will be chairmanned by R. E. Sheffer, assistant superintendent, Aluminum Co. of America, New Kensington, Pa. Talks concern specific facets of wages and incentive plans, material handling and efficiency in man-machine systems. Inspection trip to Gulf Research & Development Co.'s laboratories at Harmarville, Pa., concludes the conference in the afternoon.

Packets Put Finger on Moisture

Envelopes with windows of moisture-permeable Lumarith acetate film are used as humidity indicators for packaged aircraft parts, drugs and other equipment which must be protected against moisture. Envelopes contain silica gel, hygroscopic crystals which change color when moisture is present.

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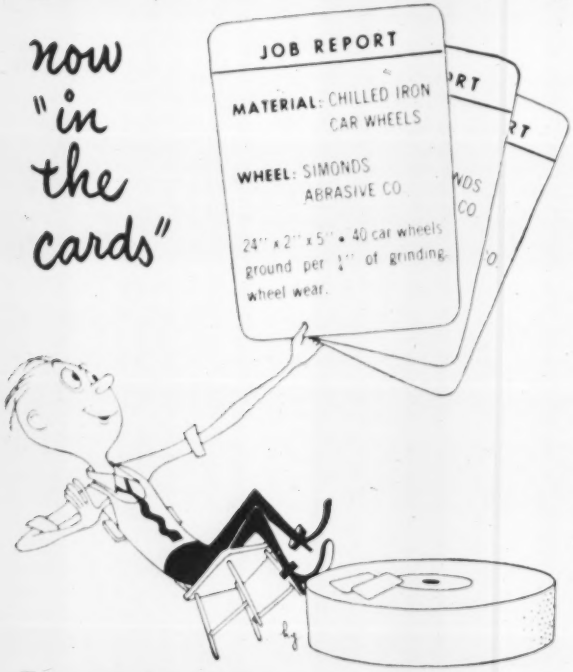
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lavender and then to deep pink during successive stages of moisture attack. Colors are printed on the envelopes for easy comparison.

Respirator Line Increased

New line of four respirators is offered by the DeVilbiss Co., Toledo, O. Two types are available. In addition to a new filter and a new cartridge respirator, two Bureau of Mines approved respirators are offered. One is for protection against dust and the other protects against fumes and vapors. Their present line will be continued without change.

Cartridge type filters protect against low concentrations of light organic fumes, vapors and gases. Filter respirators protect against light concentrations of dusts produced in grinding, coal yards, etc. Where protection is needed against poisonous and disease producing dusts the filter type, Bureau of Mines approved, model is recommended. Another bureau approved model uses a double cartridge and is for use where low concentrations of light organic fumes are encountered.

Long-Bed Planer Installed

Used primarily to bevel steel plate prior to welding, the 40-ft. open throat planer installed by Wyatt Metal & Boiler Works, Houston, has a top carriage speed of 45 fpm. With a $\frac{1}{8}$-inch feed and a carriage travel of 15 fpm it can remove 34 cu in. of material per minute from mild steel plate $1\frac{1}{2}$ inches thick.

The 27 jacking cylinders operated by 90 psi compressed air are capable of exerting 270,000 pounds clamping pressure. They can be worked in groups or all together to clamp any length plate and prevent its buckling. Manufactured by Baldwin - Lima - Hamilton Corp., Philadelphia, the planer's over-all length is 63 feet.

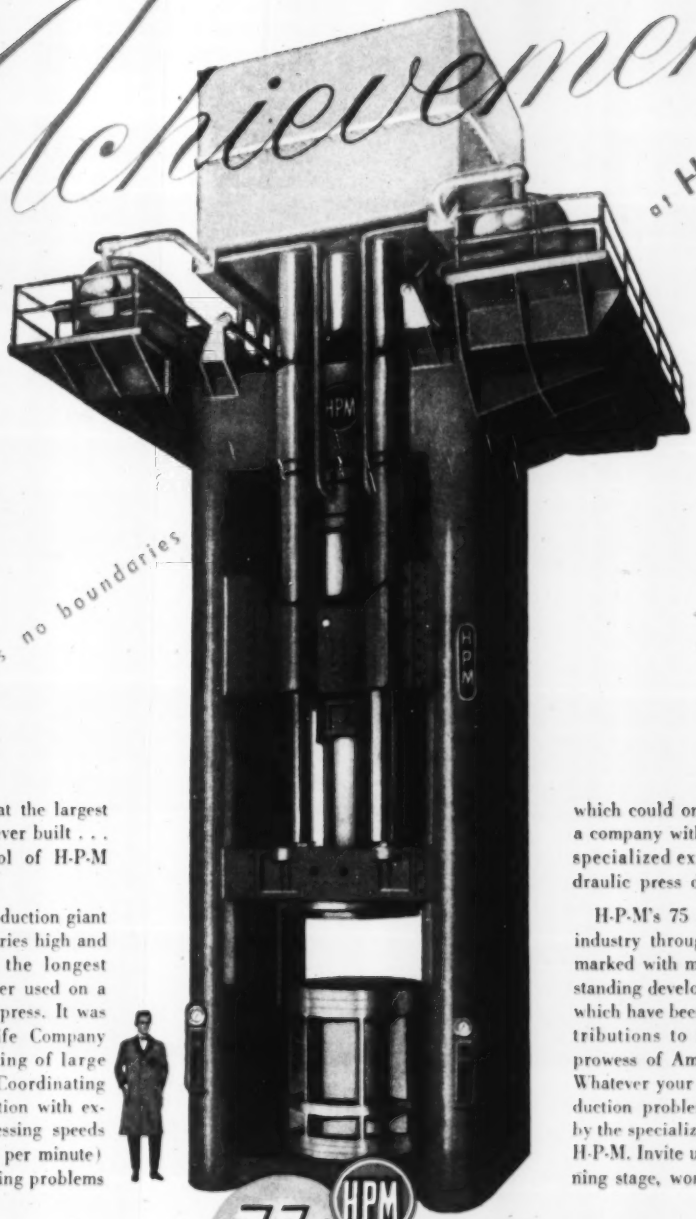
Carriage driving screw is drip lubricated for its full length and operates in tension whether cutting to the right or left. Cast iron cradles along the frame support the screw throughout its length, and antifriction bearings at the ends take care of thrust load.

Tool carriage is provided with

Achievement

of H-P-M

Recognizes no boundaries



You are looking at the largest press of its type ever built . . . a towering symbol of H-P-M achievement!

This H-P-M production giant is more than 4 stories high and delivers one of the longest strokes (108") ever used on a blankholder type press. It was designed for Scaife Company for reverse drawing of large pressure vessels. Coordinating multiplicity of action with exceedingly fast pressing speeds (up to 200 inches per minute) presented engineering problems which could only be solved by a company with many years of specialized experience in hydraulic press design.

H-P-M's 75 years of serving industry through hydraulics is marked with milestones of outstanding developments like this, which have been important contributions to the production prowess of American industry. Whatever your machine or production problem, you'll profit by the specialized experience of H-P-M. Invite us in at the planning stage, won't you?

HPM 75th YEAR

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Builders of Presses for the Metal Working & Processing Industries • Plastics Molding Presses • Die Casting Machines • Hydraulic Pumps, Valves & Power Units

Economical delivery of large tonnages over short or long distances—from one operation to another if need be (see photo above)—that's the function of the Jeffrey Belt Conveyor. You can depend on Jeffrey Belt Idlers to carry the load. They are built to take severe punishment year after year—roller or ball-bearing troughing or return types. A Jeffrey-engineered material handling system means the best in mechanical efficiency—the best method of doing your particular job, providing economy and long life in the equipment recommended. May we be of service to you?

A LOOK AT THESE MAY HELP: Bin Valves • Bucket Elevators • Chains • Conveyors • Coolers • Car Pullers Crushers • Dryers • Feeders • Idlers (Belt) • Pulverizers • Screens • Packers • Sprockets • Weigh-Feeders Transmission Machinery • • • • *LITERATURE ON REQUEST*

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operator's platform and controls to start, stop reverse and jog the carriage. Operating motor slows down and reverses through dynamic braking at end of each stroke. Carriage has two tool heads, and cross slides mount on swivel plates. Clapper boxes can be swung through 30 degrees.

Reactor Details Released

Certain structural details of the Brookhaven reactor are released by the Atomic Energy Commission. The Brookhaven National Laboratory is operated by Associated Universities Inc. under contract with the AEC.

Announcement follows removal from secrecy classification certain data of the reactors at Brookhaven and Oak Ridge National Laboratory in Tennessee. Both are low-power reactors for research and production of radioisotopes, rather than for practical production of materials for atomic weapons.

Declassification is to assist industrial concerns and universities now interested in building their own reactors. One side of the reactor is available to all qualified scientists upon approval by the director of Brookhaven and the AEC. The rest of the reactor is accessible only to persons with AEC security clearance. Reactor is a 25-ft cube of graphite. Over-all dimensions of entire unit are 55 feet by 38 feet.

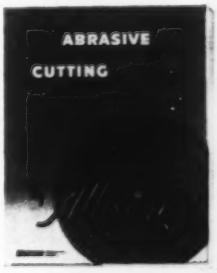
Defense Packaging Pictured

Pocket-size booklet that shows 17 applications for corrugated boxes in solving defense materials packaging problems is available from Hinde & Dauch Paper Co., Sandusky, O. Correctly engineered boxes that take into account storage, shipping room efficiency, stacking, loading and sealing are pictured for a wide range of defense items. The publication will be sent free upon request to the company.

Study Views Abrasive Machines

Case study booklet on abrasive belt machines is announced by Porter-Cable Machine Co. The publication, intended to be a basic manual on the subject, shows a complete line of abrasive machines in action, employing additional draw-

"We should have been more careful where we left our Allison Abrasive Wheel"



We'll agree this is rather an unusual application, but it goes to prove one thing. When you have a tough cutting job to do, the best way to do it is by abrasive cutting . . . with Allison Wheels. For instance, if you're cutting steel, glass, non-ferrous metals or ceramics . . . tube, rod, bar stock, or shapes . . . and regardless of whether it's by the wet or dry method . . . you'll find that Allison Wheels will cut at high speeds, accurately to a few thousandths.

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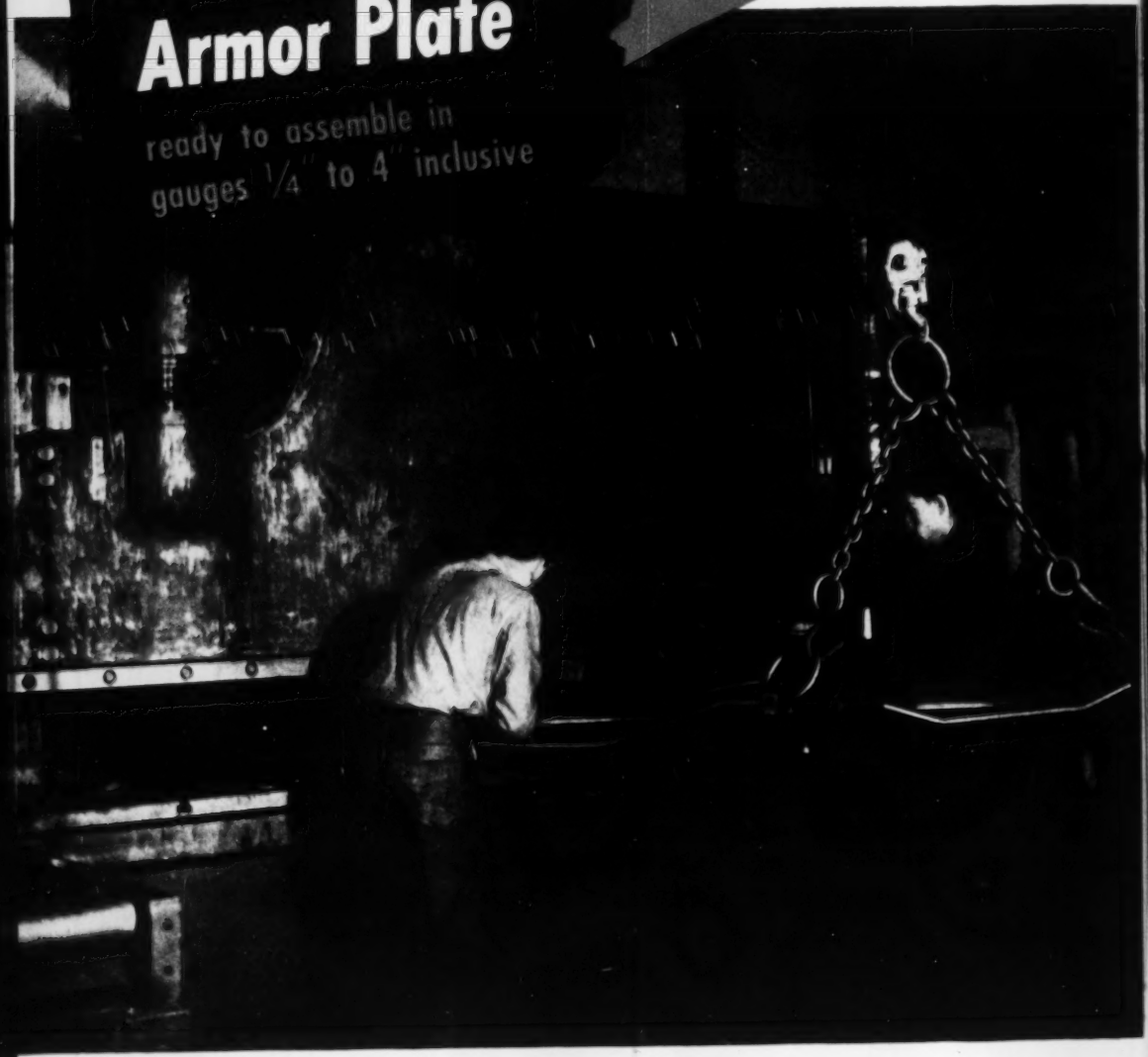

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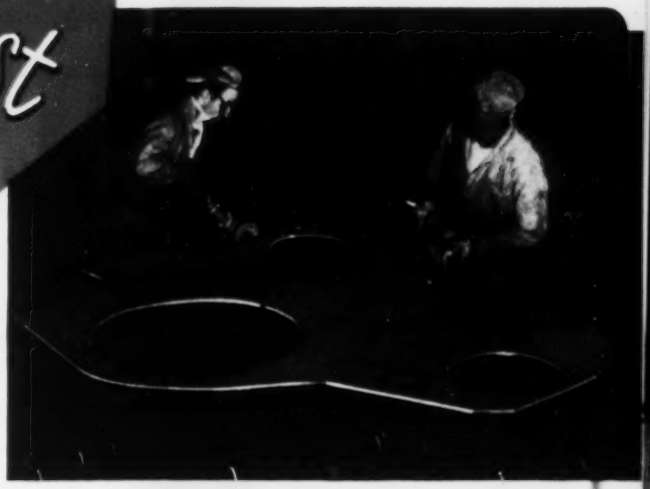
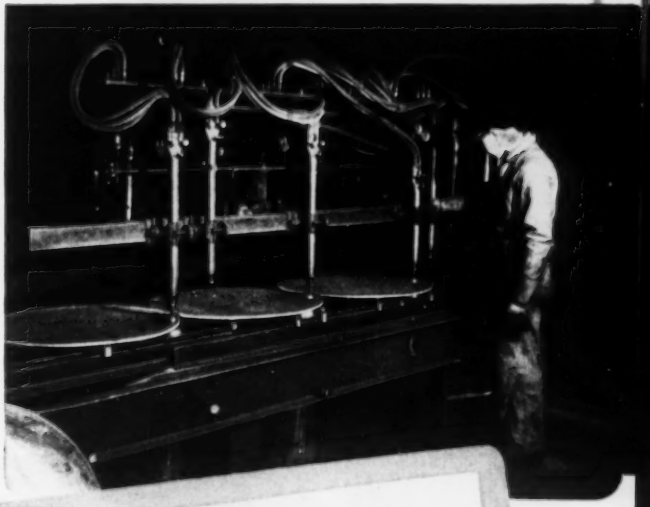


ABOVE: Edge preparation on section of armor plate.

BELOW: Torch cutting blanks salvaged from large sheets of armor plate to make smaller parts.



Maximum Production
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Our vast facilities, equipment and "know-how" permit the maximum utilization of steel for the defense program. Blanks and irregular sections cut from large sheets are all salvaged for use in fabricating smaller parts. Such end use of offal is possible only in plants where production is geared to a huge output such as ours. It saves critical steel, it saves money for our customers and it saves ordnance money. Whatever your needs for flat or formed parts, fully machined, in any shape, it will pay you to check Standard first. Write, wire or phone.

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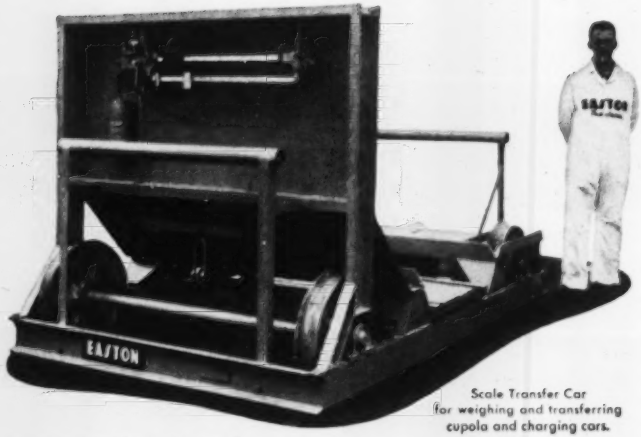

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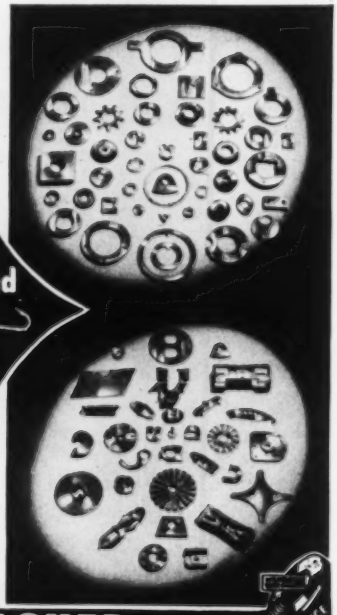

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ings to demonstrate five types of machining. It illustrates case studies of 46 grinding, finishing and polishing operations. Copies are available free from the company, Syracuse 8, N. Y.

Who's Who in Federal Buying

Question of who buys what in Washington is answered completely and authoritatively in a revised and expanded "Directory of Federal Purchasing Agents." The one-volume, 112-page edition includes all emergency agencies established since the defense mobilization program was launched in 1950. Also listed are principal Dept. of Commerce regional offices, which receive daily summaries of all government bids and prime contract awards.

Directory indexes about 6000 different items regularly purchased by the several departments and agencies. It covers every branch of government, civil and military, including foreign military aid and domestic stockpiling of critical and strategic materials. Copies are available from the publisher, Statesman Press, National Press Bldg., Washington 4.

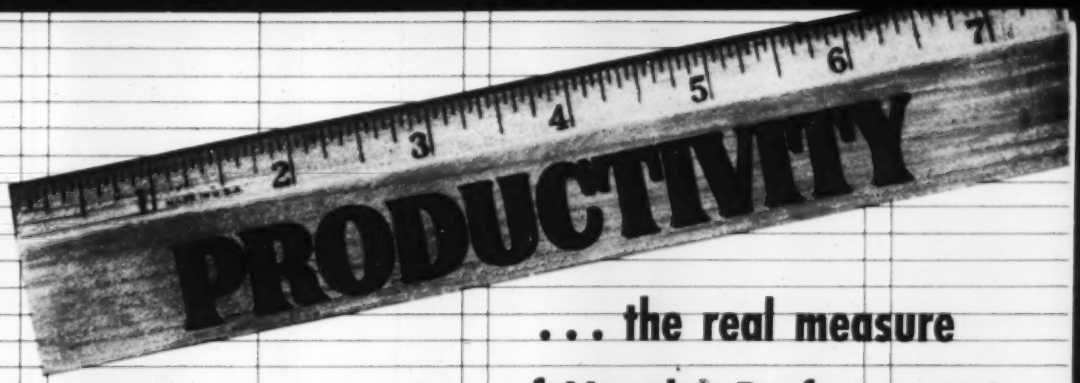
Thai Airmen Get 1000-Ton Press

Influence of U. S. tool deliveries abroad will be felt as far as southeast Asia. Hydraulic Press Co., Mt. Gilead, O., announces it has delivered a 1000-ton rubber pad forming press to the Royal Thai Air Force at Bangkok, Thailand. The company used coolie labor to haul the press 25 miles inland from the docks, reinforcing bridges before the trailer carrying the machine could be dragged across. Installation in the air force workshop took 20 days using screw jacks and cribbing without aid of overhead hoists.

Paint Fence with Long Brushes

Painting woven-wire fences with long-handled dust or floor brushes is recommended by James B. Sipe & Co., Pittsburgh. A small trough is used as a paint reservior. Paint is applied to the fence with a diagonal motion following the strands of wire. Bayonets, railings, and posts should be sprayed.

Fence should be cleaned first to remove loose scaly paint and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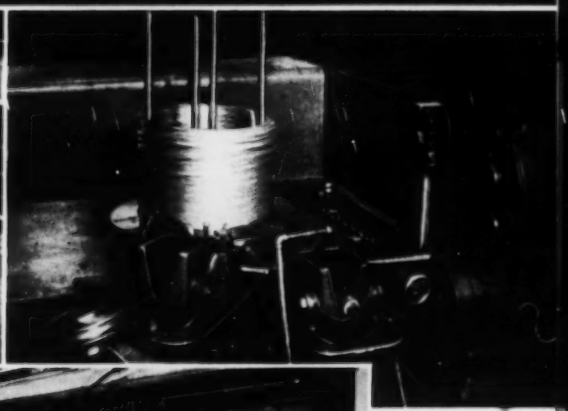

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rust. Cleaning is done in the same manner with a heavy rattan brush. Vines and other foreign matter should also be completely removed. For more detailed information write James B. Sipe & Co., Vanadium Ltd., Pittsburgh 16.

GE Turbines Top 4 Million kw

General Electric Co. produced steam turbine-generators at an annual rate of more than 4 million kw combined capacity for the first time in its history last year. Reporting the peak output, Glenn B. Warren, general manager of the turbine division, says units shipped in 1951 totaled 4,098,000 kw nameplate rating.

Breakdown of these shipments shows more than 75 per cent—or 3,144,000 kw—went to domestic utilities. Of the remainder, units with total rating of 364,000 kw were built for U. S. industries while others with combined capacity of 590,000 kw were exported. In addition, the company's Lynn, Mass., plant accounted for marine and navy propulsion units with combined capacity of 320,000 hp, and marine and navy auxiliary turbine-generators rating 9000 kw. Finally, the Small Turbine & Supercharger Dept. at Fitchburgh, Mass., shipped mechanical drive turbines totaling 140,000 hp.

Mr. Warren says 1952 schedules for the Gas Turbine Dept. at Schenectady call for shipping 40 units—near capacity production. In 1951 this department shipped five units. The big question here is whether materials will be allotted by the government to fill orders from industry, railroads and utilities already on hand.

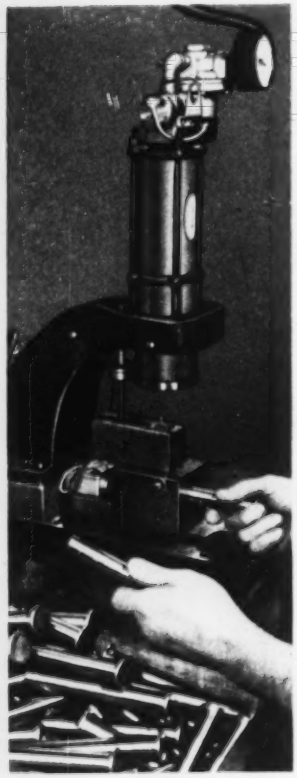
Design emphasis last year continued the trend toward higher operating temperatures, pressures and reheat features. Figures given by the division in terms of combined capacity show nearly 99 per cent of the Large Steam Turbine Generator Dept.'s output operates at 900 F or higher; 67 per cent is in the 950 F to 1050 F range. Of this same production 66 per cent functions at pressures of 1200 pounds or higher; another 14 per cent at 1800 pounds or higher. More than 36 per cent incorporate the reheat feature.

Cat Cracking Costs Cut

Stretched steel lining designed to cut cat cracking costs by reducing deterioration of cast refractory is being installed at the Baton Rouge, La., refinery of Esso Standard Oil Co. The cyclone unit's function in the catalytic cracking process is to separate solid catalyst particles from the hot flue gases leaving the cat cracker regenerator.

In regenerating, some catalyst is entrained from the dense catalyst bed by the flue gases. When gases are passed through a battery of cyclone separators installed in the top of the vessel, they effect recovery of the catalyst. Inside the cyclones the high speed stream of flue gas separates from the catalyst particles which fall to the bottom.

As the cast refractory inside the cyclones must withstand continuous abrasion at elevated temperatures it must be securely bonded to the inner surface. Special wide-strand expanded metal was made by Wheeling Corrugating Co. for



The Super-Speed Air Motor mounted on a Bellows Air Motor Arbor Stand at Carmel Screw Products Co., Carmel, Ind. Inserting the part in the fixture trips the micro-switch to advance the piston, stamping the part number in the steel rod.

SMALL AIR CYLINDER
Packs Powerful Punch

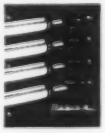
At 100 lbs. air line pressure this Super-Speed 2½" bore Bellows Air Motor develops enough force to punch a ½" diameter hole through ⅛" thick mild steel. The speed of the piston rod is six to ten times the maximum speed of a standard air cylinder of the same bore.

This extra power makes the Super-Speed suited for a wide range of staking, riveting, forming, swedging, stamping, marking and punching operations which normally require bulky, heavy duty press equipment.

BUILT-IN VALVE AND CONTROLS

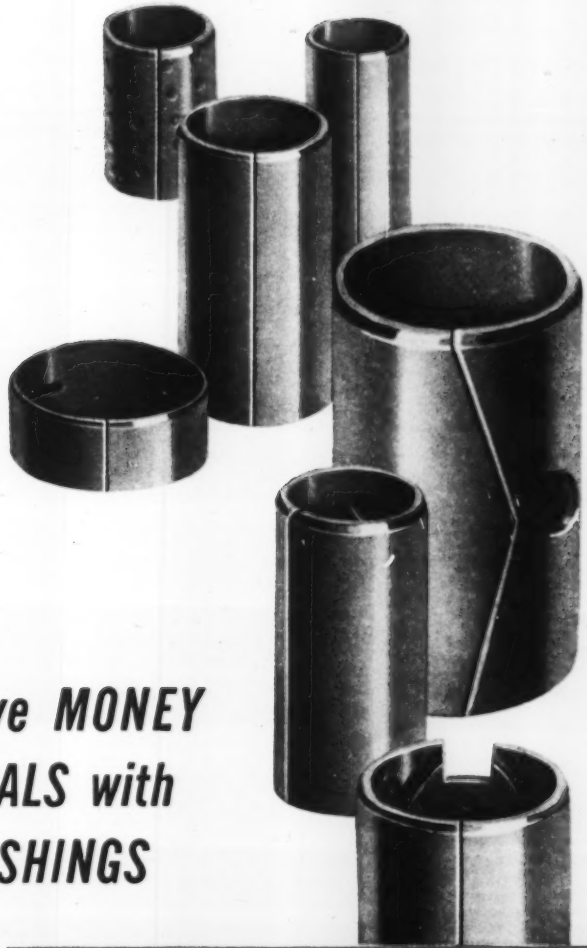
The Super-Speed Bellows Air Motor comes complete with either a built-in manually operated valve or the Bellows Electroaire electrically-controlled valve, with or without safety controls. Standard stroke length: 2", 2½",4", 6", 9" and 12".

To learn more about the many ways you can use the wide range of Bellows "Controlled-Air-Power" Devices write for this free book. Ask for Bulletin CL-30. Dept. ST352.



The Bellows Co.
Akron 9, Ohio

1301



You can save MONEY and MATERIALS with ROLLED BUSHINGS

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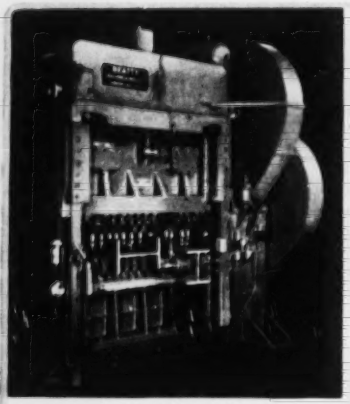
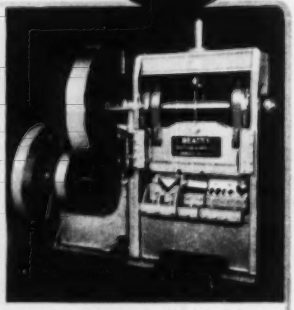
FEDERAL-MOGUL CORPORATION 11051 SHOEMAKER, DETROIT 13, MICH.

Here are Six Answers to

SIX HEAVY METAL WORKING PROBLEMS

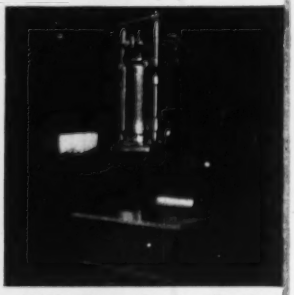


BEATTY No. 9 Guillotine Beam Punch for flange and web punching of beams up to 30".



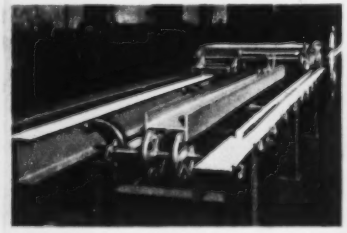
BEATTY Guillotine Bar Shear for "short-order" shearing of flats, squares, rounds without changing tools.

BEATTY Horizontal Hydraulic Bull-dozer for heavy forming, flanging and bending.

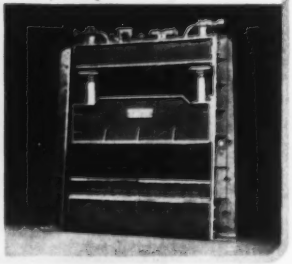


BEATTY 250-ton Gap Type Press for forming, bending, flanging and pressing.

Below: BEATTY 400-ton Hydraulic Vertical Bulldozer for heavy forming and pressing.



BEATTY Spacing Table handles flange and web punching of beams without roll adjustment.



BEATTY

Machine & Mfg. Co.

•

Hammond, Indiana

Fast, low-cost production demands machines correctly designed, correctly tooled for the job to be done. Our broad experience in the design of heavy metal working machines qualifies us to make valuable recommendations. Let us give you details and an estimate on the cost of a Beatty machine tailored to your specific needs.

this job. The large, one-piece sheets are tack welded to the inner surface of the cyclone separator.

Fatigue Test Proves Big Parts

Bruising stretcher-compressor that hits parts with 500,000 pounds of force keeps a sharp check on design safety factors in airplane components. Developed and built by Lockheed Aircraft Corp., Burbank, Calif., it permits company engineers to exert loads

SCIENTIFIC TORTURE CHAMBER
. . . a sharp check on safety features

exceeding the most extreme flight conditions.

Pressure-applying apparatus is suspended from a steel girder framework. Two heavy beam assemblies are suspended by flexible mountings from both ends of the overhanging frame. Pressure comes from two sources: An electric-powered rotating unbalanced weight in one beam assembly; a horizontal hydraulic jack interconnecting the beam assemblies at their lower ends.

These forces set up vibrations reaching a maximum 2000 per minute or minimum 5 per minute. Connecting rods, varying in length with size of the part, hold the specimen in place. When the weight starts rotating, it sets up a vibration, adding applied force equal to that of the hydraulic jack. This causes total torture to alternate rapidly, compressing and stretching while gages affixed to

QUICK-CONNECTIVE COUPLINGS FOR

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- OIL
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- VACUUM
- STEAM
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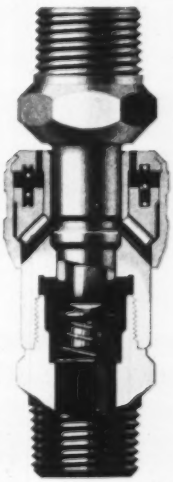
Write for Catalog

giving descriptions and sizes of complete Hansen line of straight through and shut-off couplings for hydraulic and pneumatic connections.



CONNECTION TAKES ONLY A SECOND

You save time with Hansen couplings every time you connect or disconnect a fluid line carrying gas, liquid or grease, because Hansen couplings connect or disconnect immediately—with instant automatic flow or shut-off.

To connect, merely push plug into socket—flow starts instantly. To disconnect, pull back sleeve on socket—coupling disconnects and automatically shuts off flow.

From a wide range of available sizes and types, you can select a Hansen coupling—one-way shut-off, two-way shut-off, or straight through type—each engineered for your specific application.

If you have any fluid lines in your plant, you can increase efficiency, save precious minutes, by the use of Hansen Couplings.

QUICK CONNECTIVE FLUID LINE COUPLINGS...

THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

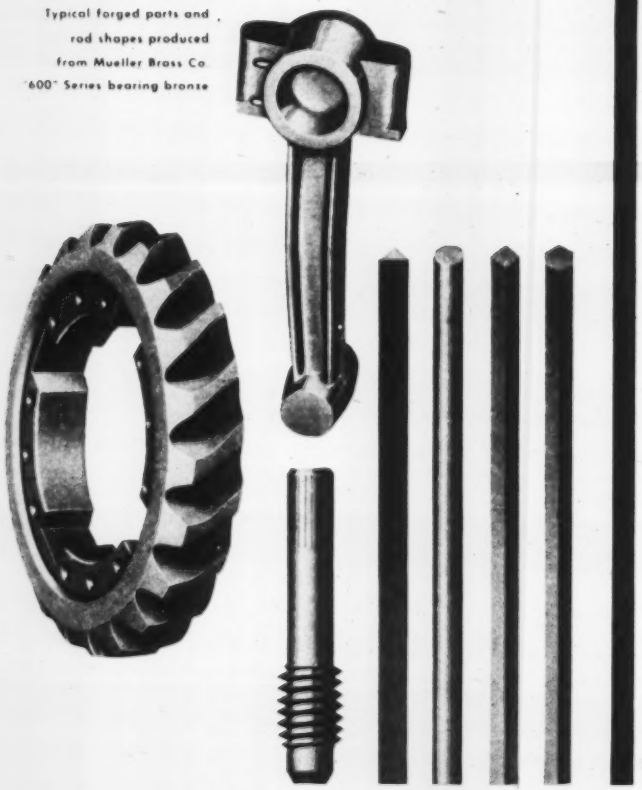
MUELLER BRASS CO.

"600" SERIES

a better bearing bronze containing no-hard-to-get tin

If you use gears, connecting rods or other parts requiring bearing properties, it will pay you to investigate "600" Series, a high strength bronze that *contains no tin*. "600" Series outperforms phosphor bronzes and other bearing metals . . . it will also save time, money, and material. "600" Series bearing metals can be forged into relatively complicated shapes and produce a forging of close-grained homogeneous structure impossible to get in a sand casting. The forged shape is closer to finished size than a casting, often requires less machining, and eliminates the need of a bushing. "600" Series is available in standard and special extruded shapes in 12' mill lengths. These alloys have a low coefficient of friction, a tensile strength 2½ times greater than cast phosphor bronzes and high resistance to corrosion. There is a "600" Series alloy with the properties to fit your bearing metal need...write today for further facts.

Typical forged parts and rod shapes produced from Mueller Brass Co. "600" Series bearing bronze



73

MUELLER BRASS CO.

PORT HURON 19, MICHIGAN

the part measure the beating.

Machine is 20 feet long, 7 feet high and 6 feet wide. It handles parts at a maximum 12 feet long and 5 feet wide. Typical of high-strength components tested are damper pistons on Super Constellation landing gear and sections of the big transport's wing structures.

Recorder Traces Shock

Improved model of their impact recorder is announced by Impact-O-Graph Corp., Cleveland. Recorder features plastic case, stylus bracket mounted on the cover and non-slip tape drive. Included are three individually operating scribe arms which record impacts from all directions, and an electric motor which permits the recorder to operate continuously a minimum of 28 days.

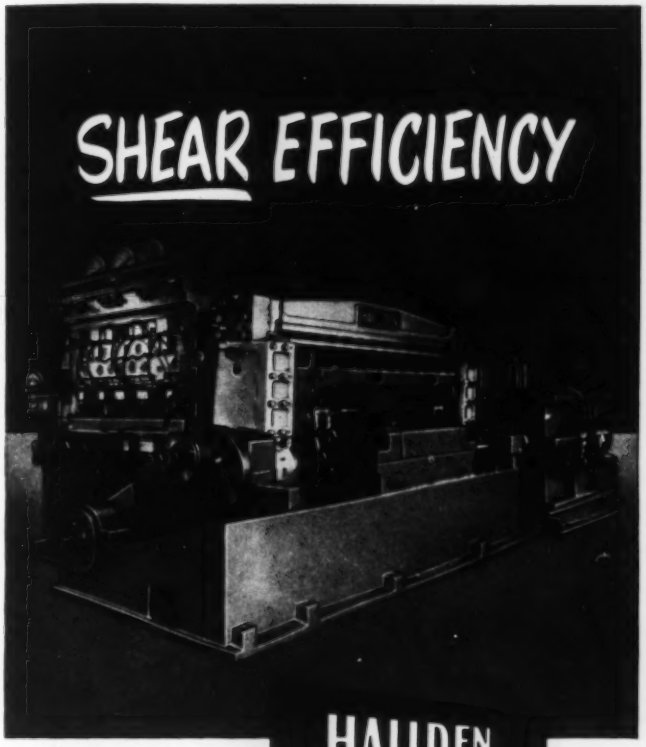
Impact recorders are used to trace the cause of shipping damage telling both the time of shock and the direction and magnitude of the jolt. Another use for them is in the pre-testing of packaging and in the determination of proper packing methods. Folder giving the details on the new recorder will be sent on request to the company, 1900 Euclid Ave., Cleveland 15.

Chemists Get Pollution Pointers

Sufficient experience has been gained in air pollution problems to establish procedures for avoiding future contamination. Where in recent years industry's efforts have been directed mainly toward curbing existing conditions, now it is in a position to anticipate possible offenses and prevent them.

This is the way C. A. Gosline, E. I. du Pont de Nemours & Co. Inc., summarized a paper, "Planing Prevents Air Pollution," at an air pollution abatement conference at Hotel Statler, New York. The annual session, sponsored by Manufacturing Chemists Association Inc., was called to exchange technical information and consider rational legislative approaches to the problem.

The speaker suggests industrial planning for anticipated pollution situations should follow a prescribed path now worn by experience. He declares the first step is securing management recogni-



Hallden Machines are designed to give modern steel mills maximum efficiency in flattening and cutting off operations. They permit continuous feed of metal through the machine at accelerated speeds while maintaining precision cutting accuracy. Low center of gravity, rugged construction and compactness assure uninterrupted operation. Remember, too, that Hallden Shears are completely automatic.

Take *your* shearing problems to Hallden, the *shearing specialists.*

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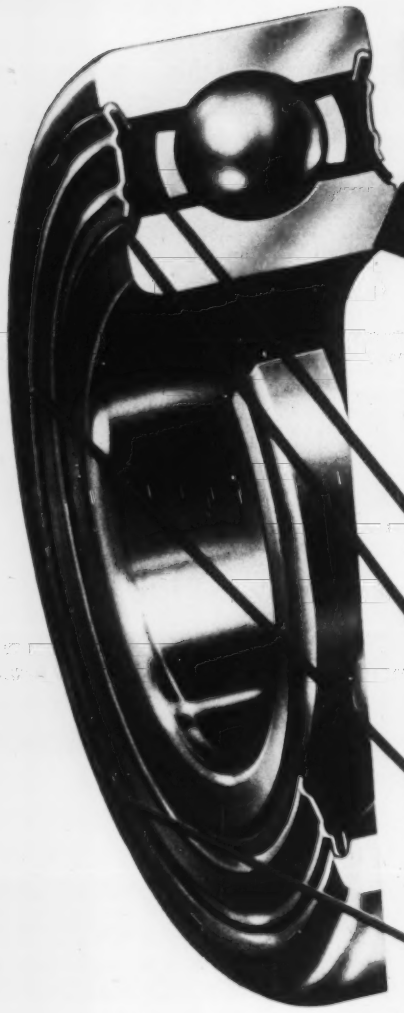


Seals OUT

SKF Red

YOU CAN SEE WHY - - -

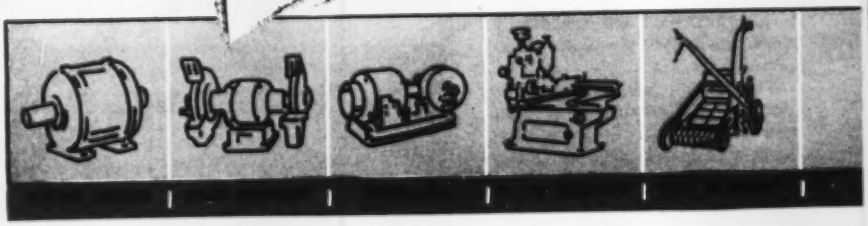
1 Seal is stable DuPont Fairprene, unaffected by petroleum-base lubricants, normal operating temperatures, or ageing.

2 Seal, extending below steel retaining ring, forms a flexible lip which lightly touches a smooth, uniform chamfer of the inner ring. This exclusive design provides effective sealing with extremely light contact, hence low friction.

3 Circular-formed ribs around the retaining rings provide great rigidity. Thus, seal contact can be light, yet certain under all operating conditions.

4 Retaining ring is staked securely during manufacture—stays put for the life of the bearing.

5 Lubricated at the factory.



TROUBLE!

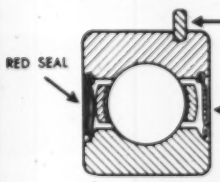
Seal bearings

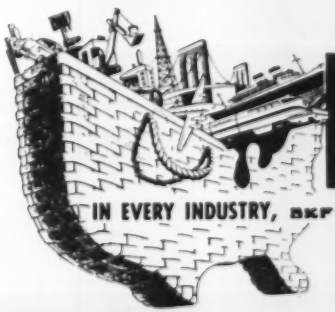
PROVED IN SERVICE - - -

Machine designers know they are competitively priced—all are standard single-row SAE widths—all are interchangeable with conventional non-sealed bearings. Proved in service by manufacturers of electric motors, portable tools, household appliances, and other machinery where the bearings must be efficiently sealed to keep dirt out—and lubricant in. Because SKF pioneered in the sealed-bearing field—the first to incorporate effective seals within the standard SAE width bearing—designers have come to depend on this store of engineering knowledge built into each Red Seal Bearing. They know, too, that the team-work of SKF field-engineers and design-engineers at SKF's headquarters are theirs for the asking.

Write **SKF INDUSTRIES, INC.,** PHILADELPHIA 32, PA.—*manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.*

RED SEALS ARE ALSO AVAILABLE WITH SNAP RINGS AND METAL SHIELDS—ANY COMBINATION OF THESE THREE FEATURES ARE AVAILABLE





SKF
BALL AND ROLLER BEARINGS

IN EVERY INDUSTRY, SKF Puts The Right Bearing In The Right Place

Exclusive *open throat design* of the **BATH TANGENT BENDER** assures continuous high speed production of metal cabinets, cases and housings. **Flanged** sheets can be shaped to produce cabinets having two or more radius corners. Crown, corners and sides are formed in **single cycle of operations.**

BATH TANGENT BENDER features automatic positioning of metal to be formed and close control throughout the entire process. *Result is volume production of uniform shapes without work wrinkles or deformation.*

BATH TANGENT BENDER can accommodate radius corners from $\frac{1}{8}$ to 5 inches. As it forms the shape, it can perform any slitting, piercing, stamping or cutting operation within its 17-ton capacity.

CB THE CYRIL BATH COMPANY

6972 Machinery Avenue • Cleveland 3, Ohio

tion—the key to success in ultimate solution of abatement. Then, at research and pilot plant stages, gather necessary data to define most of the process conditions and waste characteristics. When alternate sites are being considered, form a realistic estimate of potential problems in the light of on-the-spot examinations.

After a site is selected, make on-site measurements to define dispersion coefficients, measure persistence of stagnant air and survey vegetation. Then develop a waste disposal flow chart and apply data gathered to each process step, building and piece of equipment as is necessary.

Stainless Uses Studied

Uses for stainless steel in architecture are listed in a booklet from the Committee of Stainless Steel Producers Of American Iron & Steel Institute, 350 Fifth Ave., New York. Called "How and Where to Specify Stainless Steel In Architecture," the booklet lists almost 300 different construction applications of stainless, ranging from air conditioning ducts to show windows. It provides information on some 20 different groups of fabricated stainless products ready for installation.

Also included in the publication is a specification guide for the architect and construction engineer. This section discusses recommendations for good practice in handling stainless by metal contractors.

GE Supplements Fractional Line

Fractional horsepower motors with a new concept of motor design and manufacture have been announced by the General Electric Co. Designated as Form G, the motors weigh as much as 51 per cent less per horsepower than the models they replace and are smaller in size with a modernized appearance.

Motors are available in open dripproof and totally enclosed fan-cooled models. Design incorporates an insulation system consisting of a special nylon material combined with wire and varnish.

Motor conforms fully to all NEMA specifications and will be offered in a complete range of

SOMETHING NEW IN ROLL COVERING SERVICE!

QUAKER SAVES YOU— TIME, FREIGHT, PRODUCTION!

JUST SHIP ROLLS TO YOUR NEAREST QUAKER BRANCH

Why pay big freight charges to ship rolls cross country to have them recovered, reground or crowned!

Now you can ship practically any type roll to your nearest Quaker branch. A fast Quaker truck will pick it up and speed it, *free of charge*, to the Quaker plant in Philadelphia for refinishing. You save time, freight and production.

Quaker's Philadelphia craftsmen offer you extensive technical know-how plus more than a quarter century of experience in roll covering. Using latest techniques and equipment, they can handle rolls from 6 to 36 inches in diameter . . . to 204 inches in length . . . up to 16 tons in weight. Rolls can be covered with crude rubber, neoprenes or other synthetic construction—from "O" P & J reading to "260" . . . or 25-100 "A" shore durometer. Hardness and composition of your present roll covering can be matched to exact specification by Quaker's staff of skilled laboratory technicians.

Take advantage of this fast, *new*, economical service. For complete details, get in touch with your nearby Quaker branch today. Quaker branches are conveniently located in Pittsburgh, New York, Cleveland, Chicago, Houston, Atlanta, Detroit, Boston and St. Louis.

NEWLY INSTALLED, LATEST TYPE EQUIPMENT can handle practically any type roll up to 16 tons.

QUAKER RUBBER CORPORATION

DIVISION OF H. K. PORTER COMPANY, INC.

PHILADELPHIA 24, PA. · BRANCHES IN PRINCIPAL CITIES

standard horsepowers, speeds, voltages and frequencies. Bulletin GEA-5567, describing the motors will be sent on request to the General Electric Co., Schenectady 5, N. Y.

Eye Controls Headlights

Automatic headlight beam control is performed by the Autronic-Eye, a development announced by C. A. Michel, general manager, Guide Lamp Division, General Motors Corp., Anderson, Ind.

Mounted behind the windshield, the eye sees what the driver sees and acts instantly and automatically. When it sees a bright light approaching, it dims the headlights and returns them to the bright beam as the car or cars pass. When driving on brightly lighted streets, the lights are held on the lower beam.

The Autronic-Eye includes a photoelectric unit mounted above the instrument panel near the lower left corner of the windshield. An amplifier unit and power relay are mounted in the motor compartment. The standard foot switch is connected so in one position it provides automatic control of the selection between upper and lower beams. In the other position it keeps the headlamps on the lower beam continuously.

An over-riding foot switch is supplied in addition to the regular foot switch, to permit the driver to momentarily switch from lower beam to upper beam. The eye is being made available immediately on 1952 Oldsmobile and Cadillac cars.

Heat Treat Problems Studied

Matching a furnace to a particular heat treating problem is discussed in "Harnessing Heat," a booklet from Westinghouse Electric Corp., Pittsburgh. Twelve different types of furnaces, both gas and electric, are described and their chief fields of application outlined. A section devoted to special furnaces gives several typical examples of tailor-made furnaces designed to meet specific problems.

Protective atmospheres are described and combinations and applications of these are given. The booklet also contains information on material handling methods in furnaces, atmospheres suitable for heat treatment of different metals, average general performance data, and a glossary of terms. For a copy of this booklet, B-5459, write the company, Box 2099, Pittsburgh 30.

Magnet Pulls Iron from Sand

At the Meadow Lands, Pa., plant of the American Brake Shoe Co. a permanent magnetic drum is being used to remove quantities of core wire and tramp iron from foundry sand. The magnet installation consists of an 18-inch wide revolving cylindrical shell containing a stationary permanent magnet. The magnet covers about half the cross sectional area of the drum.

Ferrous-contaminated sand is fed into the drum hopper where the rate of flow is regulated. The sand then falls onto the revolving stainless steel shell. The magnetic tramp iron adheres while the nonmagnetic sand falls off and out through a discharge chute. The iron sticks to the shell until rotated out of the magnetic field. It is then released

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Beautifies As It Protects!
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Cut maintenance costs. Apply RUST-OLEUM directly over rusted surfaces without removing all the rust! Just wirebrush and use sharp scrapers to remove rust scale and loose particles, then apply by brush, dip, or spray. Costly sandblasting and chemical precleaning are not usually required. Specify RUST-OLEUM for every rustable metal surface. Prompt delivery from Industrial Distributors in principal cities.

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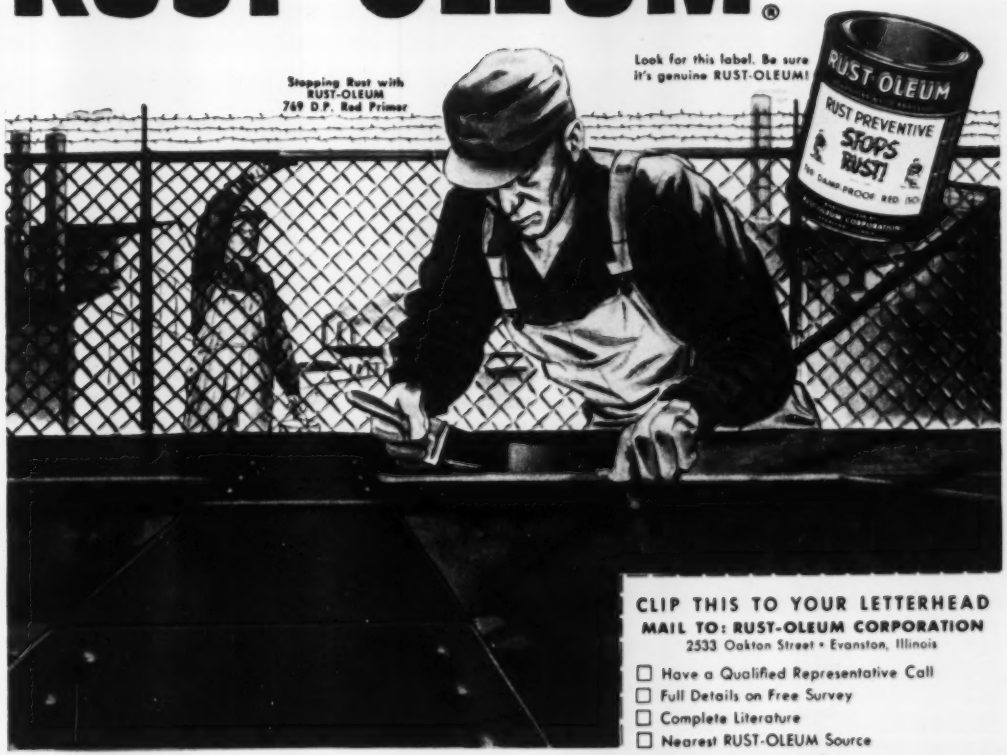
Protects Tanks, Girders Fences, Stacks, Metal Sash, Roofs, Buildings, Marine and Railroad Facilities

Stopping Rust with RUST-OLEUM 769 D.F. Red Primer

Look for this label. Be sure it's genuine RUST-OLEUM!



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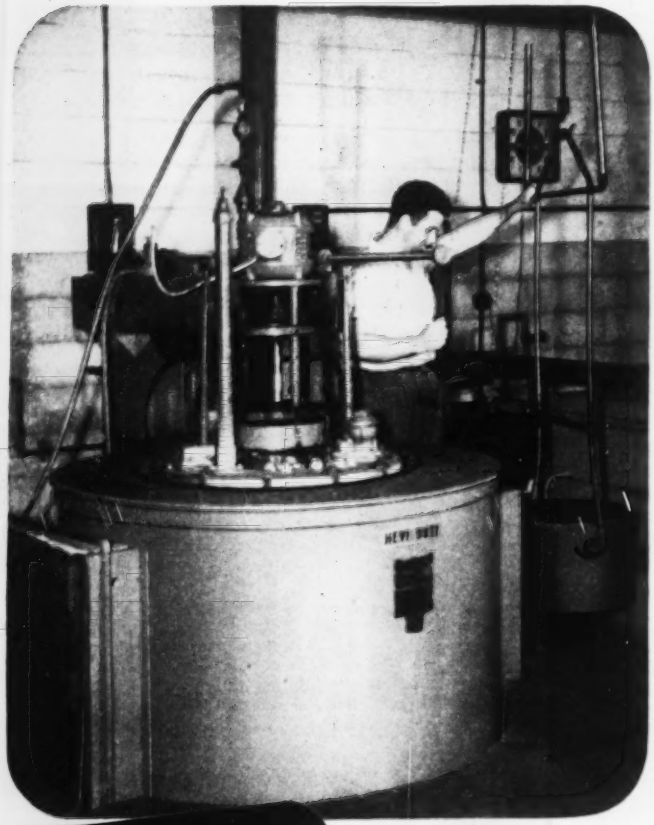


"Exceptionally Versatile" . . . that's why Pesco bought HEVI DUTY FURNACES

"We use our rugged Hevi Duty furnaces for carburizing, nitriding, hardening and normalizing parts for jet engine pumps," says Russ Fike chief metallurgist of the Pesco Products Co. "We can carburize one load and nitride the next by simply changing the atmosphere. Operating costs are at a minimum due to low ammonia consumption when nitriding, and our maintenance costs are negligible."

Learn how the versatile Hevi Duty vertical retort furnace can solve your production problems, write for your copy of bulletin HD-646 today.

HEVI DUTY

HEVI DUTY ELECTRIC COMPANY

MILWAUKEE 1, WISCONSIN

Heat Treating Furnaces . . . Electric Exclusively

Dry Type Transformers *Constant Current Regulators*

and discharged into a separate chute. The units are made by the Eriez Mfg. Co., Erie, Pa.

Alloy Parts Cited for Long Wear

Cast and wrought alloy parts now being used in industry to solve abrasion, corrosion, and high temperature problems are described in a booklet from Haynes Stellite Co., a division of Union Carbide & Carbon Corp. Called "Long-Wearing Machinery Parts," the booklet contains blueprints, tables and photographs showing some of the sizes and shapes in which these parts are being used.

Parts described are made of the various cobalt, iron and nickel base alloys which have been used as metal cutting tools, jet aircraft parts, chemical equipment and valve and furnace parts. Forms are included for description of particular problems to be submitted for alloy recommendations. Copies will be sent on request to the company, Box 746, Kokomo, Ind.

49'ers Never Had It So Good

Revised edition of Atomic Energy Commission's handbook for uranium prospectors is available from Superintendent of Documents, U. S. Government Printing Office, Washington. The booklet is published jointly by the Atomic Energy Commission and the U. S. Geological survey.

Shown are eight color reproductions of common uranium bearing ores. Book also contains latest official price circulars, including Domestic Uranium Program Circular 6 that provides a bonus for initial production of ores from domestic mines. Compilation of public land orders lists tracts withdrawn from public use.

Motor Drive Brings Peak Output

Sterling Electric Motors Inc., Los Angeles, says it increased production about 40 per cent when by installing its electric power drive on a Monarch Keller Magna-Matic lathe. The lathe is used for turning and facing variable pitch pulleys.

Lever-controlled infinitely variable speed drive makes possible maximum machine output by providing automatic continuous ad-

justment of spindle speed. This holds cutting speed at 375 fpm over the changing diameter of the pulley face. Continuous adjustment is accomplished by a direct linkage from machine cross slide to speed adjustment lever on the power drive.

Plastic Pipe Has Deep Well Use

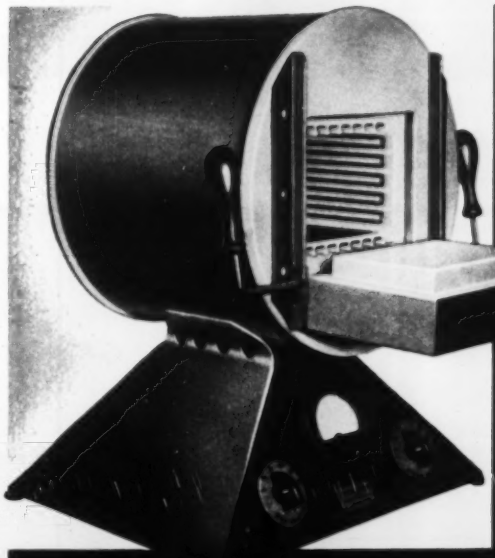
Plastic pipe is solving a water problem at Timken Roller Bearing Co.'s Columbus, O., plants. The company uses four deep wells—two supply and two return—to provide water for its cooling proc-

SOLVING A WATER PROBLEM
. . . wells are tubed down to 475 feet

esses. Return wells were about 120 feet from supply wells, and both were 400 feet deep. Warm water entering the returns was finding its way into the supply and raising temperatures appreciably.

To overcome the problem, the company drilled return wells to a depth of about 500 feet, then tubed them with rigid plastic pipe to 475 feet, packed off at the 400-foot level. This makes warm water enter the strata below the source of supply. Pipe was supplied by Yardley Plastics Co., Columbus.

Deep well pumps are suspended in the supply wells on the foot of 6-inch pipe columns. Water in each column is under pump pressure, so any leakage is from the inside to the outside of the pipe. Red brass replaces wrought iron in



HEVI DUTY
"MULTIPLE UNIT"
MUFFLE FURNACE
For Temperatures To 2000° F.

Instruments and Controls operate at approximately room temperature . . . . there is no trapped heat.

As a result of correct insulation design, you can shift rapidly to desired operating temperatures.

Reversible and easily replaceable Multiple Units, time-tested for 30 years, have been retained.

36 steps of control through a Hevi Duty Tap-Changing Transformer allows maximum flexibility of control.

Controls are mounted in a recessed position for safety and at correct angle for proper vision.

Rear panel is removable for access to terminal board. Release of front panel permits control assembly to slide forward.

This furnace has been designed for general laboratory requirements such as drying of precipitates, ash determinations, fusions, ignitions, heating metals and alloys, enameling, heat treating, and experimental test work.

The efficient Hevi Duty Muffle Furnace shown is housed in a cylindrical shell mounted on a pyramidal type base with practicaly line contact between them . . . allowing for free circulation of air and eliminating trapped heat in the base. Available in four standard sizes.

For complete details, construction, and specifications, see your Laboratory Supply Dealer, or write for Bulletin LAB-849.

"MULTIPLE UNIT"

HEVI DUTY ELECTRIC COMPANY
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Heat Treating Furnaces . . . Electric Exclusively
Dry Type Transformers *Constant Current Regulators*

When the products you make call for a special fastener . . . to add extra holding strength, simplify design and production requirements or to cut costs . . . you'll find that it pays to call us in. Circle Ⓑ fasteners, individually designed to your jobs, are made by modern methods to meet volume demands.

To simplify specifying and ordering . . . be sure you have the latest catalog. No. 51 is the most complete and concise you can use. Write for your copy.

this application in an effort to cut down damage from hydrogen sulphide gas.

Motor Brushes Listed

Anticipating wide acceptance of the Association of Iron & Steel Engineers' standards for mill motor brushes, National Carbon Co. offers bulletin No. CP-2444 listing a complete line of their mill motor brushes built to conform to AISE standard specifications. The bulletin lists all of the AISE standard numbers and code numbers, and the corresponding National brush numbers, sizes and grades.

Many of the brushes are shipped from stock and the remainder are set up for quick fabrication in the factory. For a copy of the bulletin write National Carbon Co., division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17.

Combustion Control Cited

Case history describing the operation of Scovill Mfg. Co., Waterbury, Conn., is available. The equipment and operating philosophy which enabled this plant to achieve an evaporation rate of 12.8 and a cost per thousand pounds of steam of 70.6 cents is covered. Use of steam, fuel and ash handling and plant steam demand are discussed and illustrated. Schematic drawing reveals the operation of the combustion control system. Also a drawing of the instrument panel is tied into actual photographs of functions performed by particular controllers. Bulletin R-8 may be obtained from Hays Corp., Michigan City, Ind.

Machine Tools Reclaimed

Under a program to recover machine tools in the hands of educational institutions, 260 units were recovered and placed in defense production with a total cost to the government of $16,500. If these tools were bought they would cost about $600,000. The program was launched Jan. 15 by NPA in conjunction with the Federal Security Agency and the Defense Department. Under the program, between 5000 and 25,000 machine tools are expected to be placed in the hands of defense contractors.

Title to the machine tools, trans-

Exide-Ironclad
BATTERIES

ARE YOUR BEST POWER BUY— AT ANY PRICE

They ASSURE high maneuverability of trucks . . . rapid, accurate handling of material. PROVIDE uniform rate of material handling with no unscheduled down time. SHOW lowest costs of operation, maintenance, repair, depreciation . . . inherently safe. Call in an Exide representative, and let him prove these facts.

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Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

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Carrying on a *tradition*

In a company that's really worth its salt, there's always a strong sense of group responsibility, or team spirit, among the men . . . a desire both to protect traditions and high standards, and to pass them along.

Such a company, like our own organization, usually has a liberal salting of 20 and 30-year men in its plants, too. Not just workmen, but craftsmen —men who do *quality* work as a matter of habit and pride, and who are equally proud and eager to hand on their storehouse of skill to newcomers in our company, especially the younger men.

That is why users of Columbia and Summerill products have found them steadily dependable and trouble-free over the years, and will continue to find them so.

WAD 3939

Columbia STEEL & SHAFTING COMPANY

SUMMERILL TUBING COMPANY DIVISION

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SPECIALIZING IN COLD FINISHED STEEL BARS and SEAMLESS STEEL TUBING

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for Close-Tolerance Production

The reputation of L & J Presses has been built by doing tough jobs — close-tolerance jobs that require sustained accuracy. These rigid, precision-built presses have simplified difficult press work on a wide range of applications. They are built for it! Heavy, deflection resistant frames . . . ruggedly designed slides with extra long gibs . . . and many other important features all contribute to their efficient operation.

L & J Presses are made in 12 O.B.I. models back geared and plain flywheel types and 8 sizes from 6 to 80 ton capacities.

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SPECIFICATIONS
No. 7 Back Geared Press
(Illustrated)

80 ton capacity, 4" standard stroke, 41 strokes per minute, 15½" or 20" die space (bed to slide, stroke down, adjustment up), 38" x 24" bolster plate area L. to R. x F. to B., 12½" throat depth, 17½" opening through back, 15,000 lbs. net weight. Also made in plain flywheel type.

L&J PRESS CORPORATION
1628 STERLING AVENUE
ELKHART, INDIANA

ferred to the educational institutions after World War II, had been in doubt until recently. Under the procedures worked out by the Federal Security Agency, the government will pay the institutions full ceiling price for tools which were donated without qualification. In cases where clear title was not given, the government will pay only the shipping costs and expenses.

Latest institution to release machine tools is Massachusetts Institute of Technology. It released 16 tools (cylindrical grinders, vertical turret lathes, broaches, cutoff machines, etc.) to the government. Original cost of these machine tools is estimated at about $250,000.

Defense contractors will lease the required tools from the government. All tools received thus far are in excellent condition.

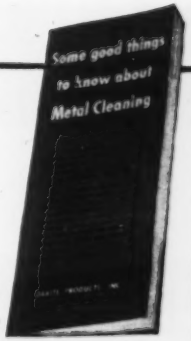
Air Pollution Reviewed

Abatement progress reported in all phases of the steel industry's processing operations

HIGH-TEMPERATURE requirements of many metallurgical processes cause numerous still-unsolved air pollution problems. Work done toward their abatement in the steel industry was summarized by C. A. Bishop, research associate, U. S. Steel Co., for Manufacturing Chemists Association Inc., which recently concluded its annual conference on air pollution abatement.

Mr. Bishop emphasized the size and complexity of exercising effective abatement throughout these integrated operations. He gave figures fixing the industry's total annual fuel requirements at more than 1 billion gallons of fuel oil, several hundred billion cubic feet of natural gas, 17 million tons of boiler coal and 94 million tons of coal for blast furnace coke. To give specific illustrations of some of the problems facing an industry burning this amount of fuel, the speaker limited his discussion to operations in Allegheny County, Pa.

Dust Loading — The first approach was a study of dust loading throughout the various periods of melting and refining in the open hearth. Because it was found that



Which of your metal-cleaning jobs would you like to improve?

Listed below are some of the operations discussed in Oakite's new 44-page illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite materials and methods can give you better production with greater economy.

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34E Thames St., N. Y. 6, N. Y.

Tell me (without obligation on my part) about Oakite methods and materials for the following jobs:

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- ☐ Steam-detergent cleaning
- ☐ Barrel cleaning
- ☐ Burnishing
- ☐ Rust prevention
- ☐ Send me a FREE copy of your booklet "Some good things to know about Metal Cleaning"

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MATERIALS • METHODS • SERVICE
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What are the new developments in Tool Grinding?

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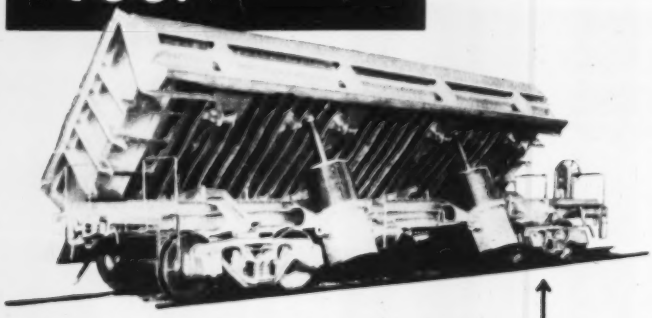
these loadings vary appreciably during course of the heat, a sampling program was developed that properly represented conditions. Heat was broken down into six periods: Melt down, hot metal addition, ore boil, lime boil, working heat and empty furnace.

Samples obtained for each period and for a number of different heats show average and maximum dust loadings. These loadings vary widely, ranging from almost zero to peaks as high as two grains per standard cu ft. Peak loads come during periods of hot metal addition, ore and lime boil and when working with oxygen. Work done to date has been carried out largely on oil-fired furnaces.

Large percentage of fume present in stack gasses from an oil-fired open hearth indicates that either an electrostatic precipitator or a high-energy requirement wet washer will be needed to reduce solid content of emission by more than 50-60 per cent.

BOOSTS EARNINGS TOO!



The Differential Air Dump Car has a way with operating expenses — cuts 'em down!

There's another pair of massive muscles on the other side of the car, too, means two-way dumping and greater flexibility.

They're built to take rough treatment — whether it's the slam-banging of the clam or the sudden dumping of tons of hot slag. These cars can take it and can come back faster for more.

Higher ratio of payload to dead weight! Fewer trips to the shop and shorter stays when they do go! Add all these up and it spells lower operating costs — another way to say "Boosted Earnings". Write for the full story on these cars.

DUMPS BOTH WAYS

Other Differential Products: Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO

SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

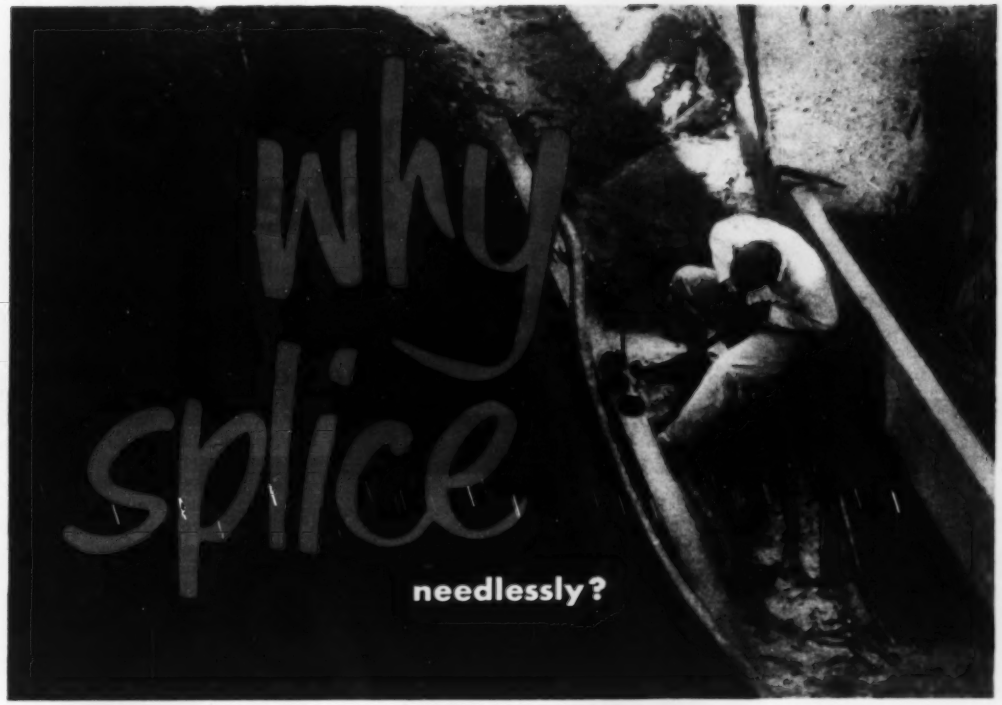
Gas Cleaning—Several types of equipment have been studied in connection with open hearth gas cleaning. However, cost of such equipment may be prohibitive if the stack must be rendered visually clear, since this requires a 95-98 per cent emission reduction. Because of small particle size—about 90 per cent are smaller than 5 microns—stack gasses appear dirty even though fume is present in small amounts. In this case it must be decided whether the standard is to be actual solids concentration or visual inspection.

Another complication may result from recent practice of adding oxygen directly to the bath during the heat to accelerate refining. Use of a Venturi scrubber is suggested for removing dust under these conditions. Efficiences of 97-99.7 per cent are reported, but power and maintenance costs are extremely high.

For bessemer converter problems, there appears to be no ready answer. Major difficulty lies in design of a suitable arrangement to confine gasses for treatment. When this is accomplished, dust loadings and characteristics of solids will be measured.

Ferromanganese Cleaning—Another problem occurs where blast furnaces produce ferromanganese. Dust found in its furnace gas is of two types. One, comprising about 20 per cent of dust present, consists of particles above 20 microns. This fraction is removed from the gas stream by a conventional dust catcher. The second type, which accounts for about 80 per cent of solids present when gas leaves the furnace, is a typical fume with particle sizes ranging from 0.10 to 1.0 micron. Vaporization and condensation process apparently forms this material. Its presence is what makes cleaning ferromanganese gas differ greatly from work on basic blast furnace gas. Project described below shows U. S. Steel Co.'s efforts to develop a practical method for removing and disposing of this fume.

First step was definition in terms of fume loadings, composition, gas flow and consumption and temperature. The company considered only three types of equipment for the commercial installation: High-energy requirement wet washer, sonic



DURASHEATH *goes* ***all*** *the way—underground, overhead, in ducts—without splices*

Splicing cable is time-consuming . . . and costly. What's more it is avoidable. All-purpose Durasheath* can be used for *all* distribution needs up to 5000 volts. It can be run in one continuous length, regardless of location . . . buried underground . . . strung overhead . . . or easily pulled through ducts. No expensive splices are necessary . . . no weak power links . . . no cluttered inventory. One cable—flexible, light Durasheath—goes all the way. You can stock *one* type instead of *three*.

Durasheath handles easily and is used in self-supporting aerial assemblies. Its rugged neoprene jacket resists moisture, chemicals, sunlight, organic decay, corrosion, electrolysis, abrasion, and mechanical injury.

For *reliable* power distribution at *lower* installation cost, insist on versatile Durasheath. See your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

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the right cable for the job

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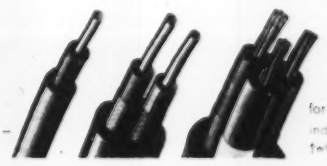

available in all sizes — from large to small — one to three conductors — up to 5000 volts

for traffic control, airport power and lighting, mines, industrial plants, railroads, street lighting and many other uses [when ordered to CAA Specification L-824]

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NORTHWEST AREA — E. A. Wilcox Company, Arctic Building, Seattle 4, Washington; Phone Mutual 1468.

BIRMINGHAM DISTRICT—Schuler Equipment Company, First National Building, Birmingham, Alabama.

coagulator and an electric precipitator.

In the final plan, it was decided to cool and condition the gas simultaneously by passing it through a spray tower that would cool from 700 F to 350 F by water evaporation. The tower operates without any water effluent, acting to humidify the gas.

Handling and Treating—Next, it was necessary to develop methods of handling and treating collected gas. Because treatment increased apparent density of the fume from about 12 pounds per cu ft to 30 pounds per cu ft, it appeared advisable to take advantage of the material's pyrophoric character. It was also found that the burned fume was more easily wetted and could be formed into briquettes that do not disintegrate in water.

A rotary kiln 10 inches diameter by 10 feet long proved successful for the burning operation. Fume was discharged from the precipitator at about 350 F. It falls down a vertical chute onto a 4-inch rotary feeder paddle that keeps material moving into the kiln.

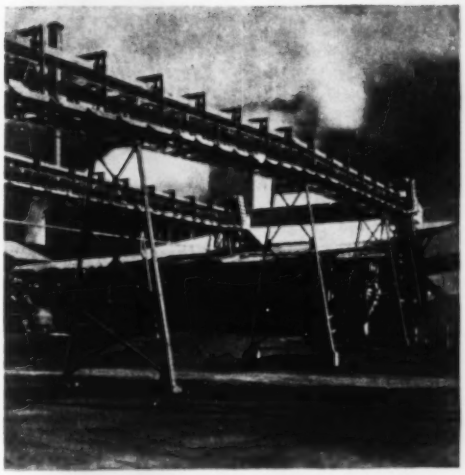
Visible effect of gas cleaning on the boiler stack effluent was impressive. That stack emitted no discernible fume, while all others did. Although the loading of the cleaned gas entering the boiler was about 0.12 grains per cu ft, stack effluent loading was only about 0.05 grains per cu ft because of gas dilution with the air used for combustion. The cleaned gas burned with a short, bright blue flame.

Canmakers' Allotments Let

Allotment increases totaling 68,000 tons of secondary tin mill plate will go to can manufacturers in the second quarter, says National Production Authority. Packers who use cans from secondary plate may exempt such cans from their present quotas, says NPA. An additional 35,000 tons of secondary tin mill products may be handed out to can manufacturers in the second quarter, but NPA says it hasn't come to a final decision yet.

Can manufacturers at the present time are getting slightly less than 1 million tons of tin plate each quarter.

HEWITT-ROBINS



A "Packaged Unit" to Meet Your Belt Conveyor Needs

The HEWITT-ROBINS SECTIONAL BELT CONVEYOR

Easy to Assemble ***Pre-Engineered***
Strongly Constructed

Here is the complete belt conveyor that will meet the requirements of both small and large operators handling bulk materials.

Easy to Assemble: Your own men can assemble, disassemble, move, extend or shorten it quickly and easily.

Take Your Choice: Select the right belt conveyor to fit your own particular needs—you have a choice of 3 types of drives—wide selection of intermediate truss lengths—your choice of idlers—(4", 5" or 6" diam.)—4 belt widths (18", 24", 30" or 36") in lengths up to belting limitations.

Factory-Assembly Units: All truss side members are factory-welded as complete units and are jig-drilled for easy erection—head and tail units completely assembled with machinery in place.

Standard Equipment: Self-cleaning, protective decking for return strand supplied for the entire conveyor line.

Optional Equipment: Hood covers—easily attached loading hopper.

Only Hewitt-Robins is able to take single unified responsibility for a belt conveyor installation—both machinery and belt.

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ROBINS CONVEYORS DIVISION
270 Passaic Avenue, Passaic, N. J.

. . . How to uncover Extra

Most tool engineers today know the advantages of using Self-tapping Screws. This one-operation fastening saves time needlessly lost tapping for machine screws, molding inserts in plastics, bolting, riveting, or soldering.

But they still may be missing some substantial *extra* savings, because all Self-tapping Screws are not alike. *Planned* savings don't always *pay off* — unless you specify "P-K".

When Parker-Kalon developed the *first* Self-tapping Screws, nearly 40 years ago, they learned how to maintain, in every screw, the uniform hardness *and* toughness, the sharp threads and accurate size, the consistent dependability that keeps assembly humming. That's why every screw in every box can be *guaranteed* first quality.

P-K SELF-TAPPING SCREW BULLETIN, 48 pages, describes all types, tells where and how to use what screw, shows typical applications. **P-K ENGINEERING STANDARDS,** 48 pages, gives standard head and thread dimensions of all P-K Screws, other useful data. *Free* on request.

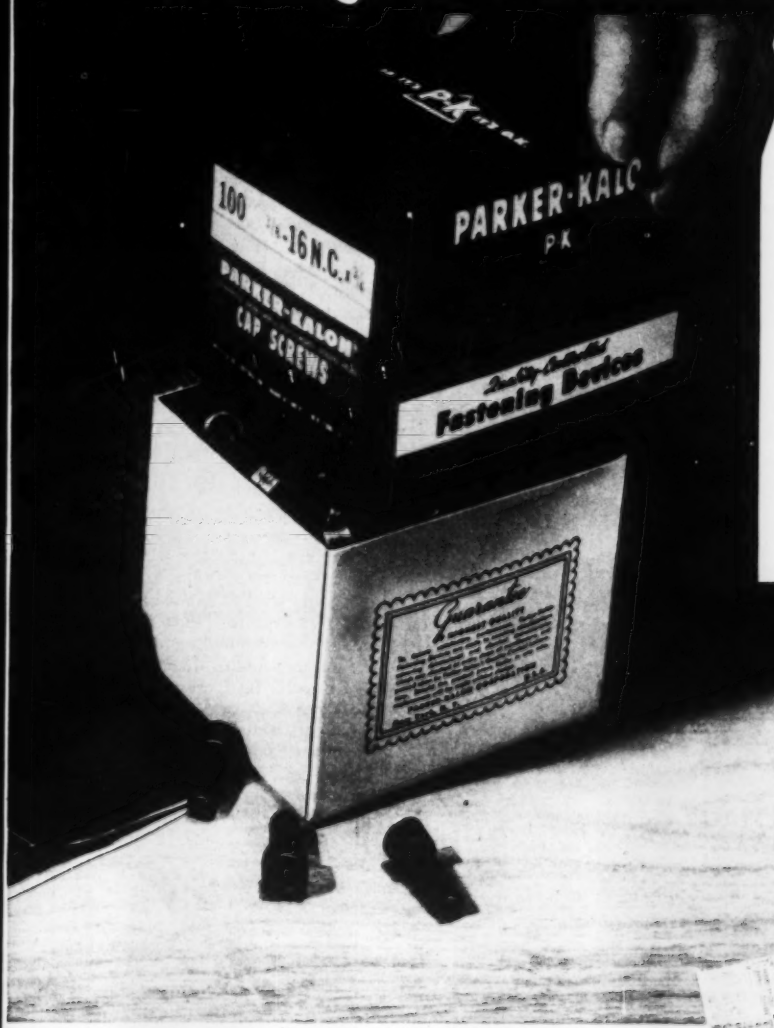
PARKER-KALON

The Original **SELF-TAPPING SCREWS**

Cold-forged **SOCKET SCREWS**

AND OTHER FASTENING DEVICES

Savings in tool assembly



P-K Socket Screws are favored by most shop men because they like the special P-K features that save time and trouble on the job, and make a better assembly.

In Socket Head Cap Screws, only P-K gives you SIZE-MARK and GEAR GRIP. The size is clearly incised on the head, can be seen at a glance. It saves time and wasted screws when sizes get mixed up, prevents errors by green help. Maintenance men like it, too — it helps them in reassembling.

In Socket Set Screws, P-K gives you GROUND THREADS. Threads are ground on hardened blanks. Smooth, bright, burr-free finish makes them easier to handle, assures uniform Class 3 Tolerance.

Ask for samples — see why P-K Socket Screws take top honors in any test.

P-K SOCKET SCREW BULLETIN, 16 pages, describes all types, and illustrates quality-control back of P-K guarantee. **SOCKET SCREW DIMENSION FINDER,** a pocket-size plastic slide chart, gives all essential dimensions of all types. Free on request.

Teamed Up to help you Step Up assemblies

The P-K Assembly Engineer is a fastening expert, fully qualified to help you plan faster, better, lower cost assemblies.

Your local Industrial Supply Distributor is an expert in procurement, with complete experience and facilities for simplifying your supply problems. Let them help you.

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Shell Molding Data Given

Realization of process' advantages depends on clean easy release from patterns

ENDEAVORING to lift the veil of secrecy from the shell molding process Dow Corning Corp., Midland, Mich., is publishing information on one phase of the operation. This company makes three parting agents used in the shell molding operation. They are emulsion No. 35, Dow Corning 7 compound and Dow Corning 7 emulsion.

Advantages claimed for the sand-resin shell process of metal casting are: High dimensional accuracy and excellent surface finish, resulting in savings in metal and machining time; ease in casting thin sections; increased production; reduced sand to casting weight ratio. In practice these advantages mean castings that require less machining.

Several Advantages—Simplicity of the process permits employing less skilled labor to make molds. Making the shell requires fewer operations and less time than sand molds. To realize these advantages it is necessary to obtain clean, easy release of the molded shells from the pattern plate.

Silicones are often used as release agents. They are relatively inert to organic materials; they do not decompose at molding temperatures to form a carbonaceous deposit; they are easy and economical to apply.

Effective as silicone release agents are, it is practically impossible to lay down specific rules governing the amount, type and agents are, it is practically imposrials in any particular application.

Follow Faithfully—There is one general rule which is of prime importance: Every new metal mold or form must be given a preliminary break-in run. In some instances this is also true of metal molds or patterns which have just been thoroughly cleaned. The simplest method is to rub a generous coating on the pattern and then heat the pattern for a short period of time at the usual operating temperature. Pattern is then ready for production and should be lubricated with the diluted parting agent. Intricate or deep draw patterns may require a second or even a third such treatment to prepare them completely.

Use of generous quantities in production is not recommended. Experience has proved that after the pattern is broken in it is better to apply a dilute dispersion of silicone often, than to apply the more concentrated release agent at less frequent intervals. Heavy concentrations provide multiple releases but there is always the possibility that the operator may forget to apply the parting agent when required. Sudden costly stickers can result.

Less Cleaning — One foundry uses Dow Corning 7 emulsion in the production of small intricate castings such as welding tongs. All the shell molds used by the entire foundry are easily produced by two men. Pattern plates which were formerly cleaned daily now go six weeks or about 2700 shells between cleanings.

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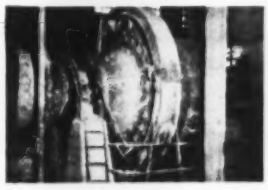
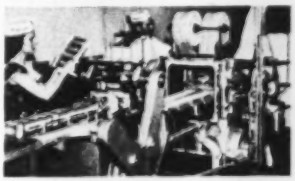
"LUBRIPLATE NO. 630-AA is practically a universal lubricant"

– so writes the SPOKANE PORTLAND CEMENT CO. of Irwin, Wash.



"With the introduction of LUBRIPLATE No. 630-AA, we were able to reduce our requirements so that today, we are satisfying all our needs for solid type lubricants with only two LUBRIPLATE Products. LUBRIPLATE No. 630-AA might almost be considered a Universal Lubricant. Furthermore, it has effected a marked savings in lubricants and labor."

Frank D. Neill
General Superintendent



LYNCH CORPORATION of Toledo, Ohio, a leading manufacturer of packaging machinery

says:

"THIS LUBRICANT REDUCES SERVICE CALLS"

"The majority of our machines are used in places where it is necessary to wash them with steam and hot water after each day's use. This naturally would remove any ordinary lubricant and trouble would develop if the machines were not immediately relubricated. With LUBRIPLATE there is always a film left on the machine after washing. Our Service Engineers can readily spot machines that have had other than LUBRIPLATE Lubrication, as these machines do not give the service they should."

"THIS LUBRICANT SAVES 7 TIMES ITS COST IN PRODUCING SHOES" – says WOLVERINE SHOE AND TANNING CORP.

"You recommended to us LUBRIPLATE No. 100 for lubricating the chain drive on our paddle wheels which turn the hides immersed in a solution in concrete vats. The chain during use is always soaked in a solution that is sometimes acid and sometimes caustic. Up to that time we had not found any lubricant that would stay on the chains for any appreciable time. The average life of a chain was approximately one year. Since we have applied LUBRIPLATE to these chains every two weeks for two years, not one chain has required replacement, and they are still going strong.

"At this time it appears that for every dollar we have invested in LUBRIPLATE, we have saved seven dollars in chains."

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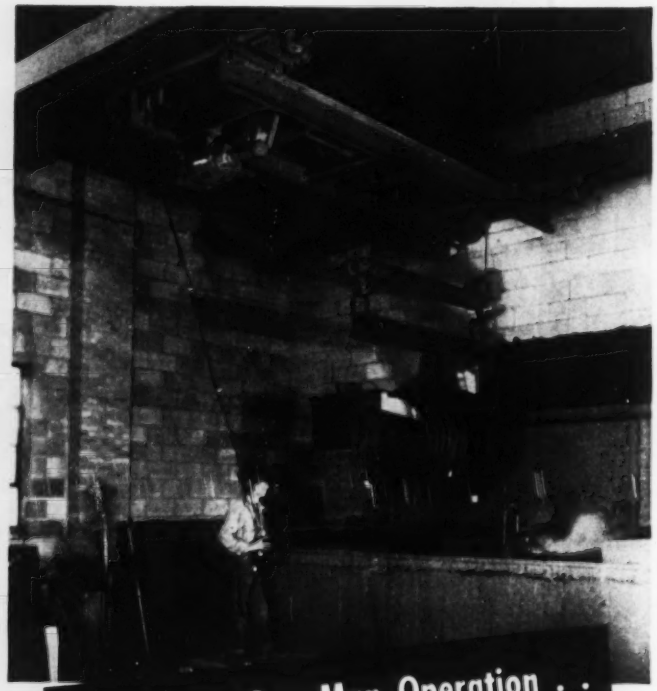
DEALERS FROM COAST TO COAST—SEE YOUR CLASSIFIED TELEPHONE BOOK



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Let an American MonoRail engineer explain all the advantages of these constant service cranes.

THE AMERICAN MONORAIL COMPANY

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CALENDAR
OF MEETINGS

March 12-14, American Society of Training Directors: Annual conference, French Lick Hotel, French Lick Springs, Ind. Secretary: R. L. Moberly, University of Wisconsin, Madison, Wis.

March 14, American Supply & Machinery Manufacturers Association and National Industrial Distributors Association: Regional meeting, Palmer House, Chicago. Conference publicity: Du Pont Circle Bldg., Washington 6.

March 16-19, American Institute of Chemical Engineers: Annual spring conference, Biltmore Hotel, Atlanta. Institute address: 120 E. 41st St., New York 17. Secretary: Stephen L. Tyler.

March 17-19, Midwest Conference on Fluid Mechanics: Ohio State University, Columbus, O. General conference chairman: Prof. A. N. Tifford, aeronautical engineering department, Ohio State University.

March 17-19, National Association of Waste Material Dealers Inc.: Annual meeting, Waldorf-Astoria Hotel, New York. Association address: 271 Madison Ave., New York. Secretary: Clinton M. White.

March 17-21, American Society of Tool Engineers: Annual meeting and biennial industrial exposition, International Amphitheater, Chicago. Society address: 10700 Puritan Ave., Detroit. Secretary: Harry Conrad.

March 18-19, Steel Founders' Society of America: Annual meeting, Edgewater Beach Hotel, Chicago. Society address: 920 Midland Bldg., Cleveland 15. Secretary: F. Kermit Donaldson.

March 18-19, Export Managers Club of New York: Annual meeting, Hotel Statler, New York. Address: Two Lafayette St., New York 7.

March 20-21, Pressed Metal Institute: Spring technical meeting, Hotel Carter, Cleveland. Institute address: 13210 Shaker Square, Cleveland 20. Manager: Orrin B. Werntz.

March 21, Materials Handling Institute: Edgewater Beach Hotel, Chicago. Institute address: 731-732 DuPont Circle Bldg., Washington 6. Managing director: R. Kennedy Hanson.

March 22-April 6, Chicago International Trade Fair: Navy Pier, Chicago. Executive director: John N. Gage, Col., U.S.A., Ret. Address: Merchandise Mart, Chicago.

March 23-27, Buffalo; March 30-April 3, Milwaukee—American Chemical Society: Annual spring meeting. Society address: 1155 16th St. NW, Washington 6. Executive secretary: Alden H. Emery.

March 24-25, American Hot Dip Galvanizers Association Inc.: Annual meeting, Hotel Drake, Chicago. Association address: 2311 First National Bank Bldg., Pittsburgh 22. Assistant secretary: Stuart J. Swensson Jr.

March 24-26, American Society of Mechanical Engineers: Spring meeting, University of Washington, Seattle. Society address: 29 W. 39th St., New York 18. Secretary: C. E. Davies.

March 24-28, National Association of Power Engineers Inc.: National power conference and exhibit, Hotel Sherman, Chicago. Association address: 176 W. Adams St., Chicago. Secretary: A. F. Thompson.

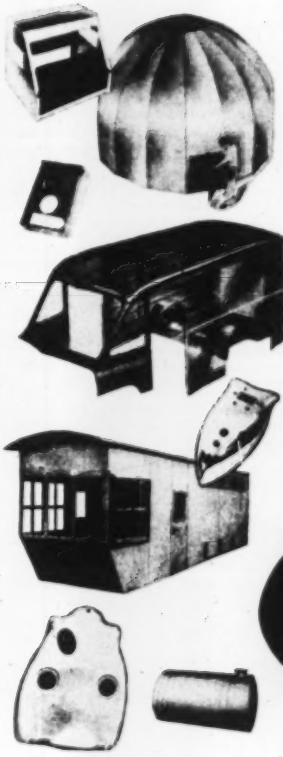
March 24-28, National Association of Manufacturers: Institute of Industrial Relations, Boca Raton Club, Boca Raton, Fla. Association address: 14 W. 49th St., New York 20. Institute director: Sibyl S. Patterson.

March 30-31, Packaging Machinery Manufacturers Institute: Semi-annual spring meeting, Hotel Dennis, Atlantic City, N. J. Institute address: 342 Madison Ave., New York 17. Secretary: Helen L. Stratton.

March 31-April 2, International Acetylene Association: Annual spring meeting, Hotel Claypool, Indianapolis. Association address: 30 E. 42nd St., New York 17. Secretary: H. F. Reinhard.

March 31-April 2, American Institute of Mining & Metallurgical Engineers: National

(Continued on p. 190)



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1700 Ridgely Street, Baltimore 30, Maryland

(Concluded from p. 188)

open hearth conference. William Penn Hotel, Pittsburgh. Institute address: 29 W. 39th St., New York 18. Secretary: Ernest Kirkendall.

April 1-3, Steel Shipping Container Institute: Annual meeting. Hotel Biltmore, Palm Beach, Fla. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

April 1-4, American Management Association: National packaging exposition and conference. Atlantic City Auditorium, Atlantic City, N. J. Association address: 330 W. 42nd St., New York. Secretary: James O. Rice.

April 3-4, Instrument Society of America: Annual steel instrumentation symposium. Hotel Roosevelt, Pittsburgh. Society address: 921 Ridge Ave., Pittsburgh 12. Secretary: Richard Rimbach.

April 4-5, National Association of Cost Accountants: Regional cost conference. Indianapolis. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

April 7-9, American Management Association: Production conference. Hotel Statler, New York. Association address: 330 W. 42nd St., New York. Secretary: James O. Rice.

April 7-9, American Society of Lubrication Engineers: Annual meeting. Hotel Statler, Cleveland. Society address: 343 S. Dearborn St., Chicago 4. Secretary: W. F. Leonard.

April 9, Cutting Tool Manufacturers Association. Spring meeting. Hotel Cleveland, Cleveland. Association address: 416 Penobscot Bldg., Detroit. Secretary: Emil Gairing.

April 9-11, Society of the Plastics Industry Inc.: Annual technical session. Reinforced Plastics Division, Edgewater Beach Hotel, Chicago. Society address: 67 W. 44th St., New York 18. Secretary: William T. Cruse.

April 16-18, American Institute of Electrical Engineers & American Welding Society, Detroit Section: Annual welding conference. Rackham Memorial Bldg., Detroit. Conference publicity: J. S. Francis, Consumers Power Co., Jackson, Mich.

April 17-18, Caster & Floor Truck Manufacturers Association: Spring meeting. Hotel Hollenden, Cleveland. Association address: 7 W. Madison St., Chicago 2. Secretary: Harry P. Dolan.

April 17-18, American Machine Tool Distributors Association: Annual spring meeting. Edgewater Beach Hotel, Chicago. Association address: 1900 Arch St., Philadelphia. Executive secretary: Thomas A. Ferrley Jr.

April 18-19, Lead Industries Association: Annual meeting. Hotel Drake, Chicago. Association address: 420 Lexington Ave., New York 17. Secretary: Robert L. Ziegfeld.

April 18-19, National Association of Cost Accountants: Regional cost conference. Atlanta. Association address: 505 Park Ave., New York 22. Secretary: A. B. Gunnarson.

April 18-21, Grinding Wheel Institute: Spring meeting. The Homestead, Hot Springs, Va. Institute address: 2130 Keith Bldg., Cleveland 15. Secretary: Frank G. Gustafson.

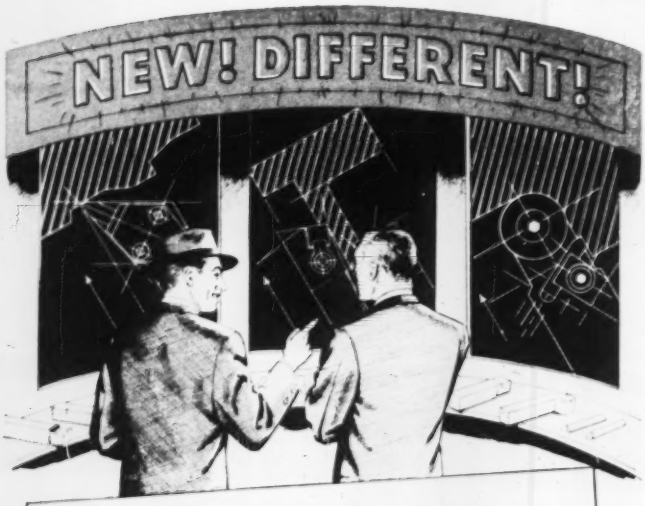
April 20-24, National Industrial Service Association: Annual convention. Hotel Conrad Hilton, Chicago. Association address: 818 Olive St., St. Louis 1. Convention publicity: McGiveran-Child Co., 162 N. Clinton St., Chicago 6.

April 21-22, American Coke & Coal Chemicals Institute: Eastern regional meeting. Westchester Country Club, Rye, N. Y. Institute address: 711 14th St. NW., Washington. Executive secretary: Samual Weiss.

April 21-22, American Zinc Institute Inc.: Annual meeting. Hotel Statler, St. Louis. Institute address: 60 E. 42nd St., New York 17. Secretary: Ernest V. Gent.

April 21-24, Society of Automotive Engineers: National aeronautic and aircraft engineering display. Hotel Statler, New York. Society address: 29 W. 39th St., New York 18. Secretary: John A. C. Warner.

April 21-25, American Institute of Steel Construction Inc.: Spring engineering conference. New York. Institute address: 101 Park Ave., New York 17. Secretary: L. Abbett Post.



See How . . .
KENNAMETAL
TOOL ENGINEERING
Increases Productivity

KENNAMETAL EXHIBIT
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ASTE
EXPOSITION
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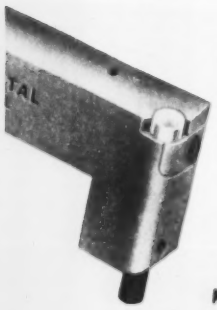
MARCH 17-21

At the ASTE show—Kennametal Inc. will demonstrate, with giant-size tool layouts, how to get improved use from your metal-cutting machines, as well as how to reduce tooling costs. Today these factors are of extreme importance as a means to help you offset the effect of inflation.



You'll see how good tools, in the hands of skilled operators, can increase productivity on a wide range of metal-cutting operations—trepanning, deep hole drilling, high production runs, heavy duty cutting, tracer jobs, carwheel boring, milling, etc. Don't miss it!

KENNAMETAL *Inc.*
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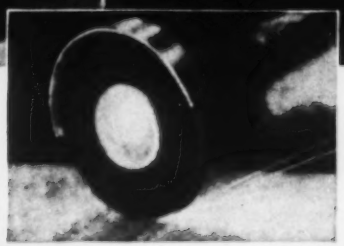
MANUFACTURERS OF SUPERIOR CEMENTED CARBIDES AND CUTTING TOOLS THAT INCREASE PRODUCTIVITY

U. S. Rubber grinding wheels work efficiently



Grinding welded sections of a continuous drier. U.S. Royalite Grinding Wheels are ideal for portable snag grinding.

And this is why: "U.S." Wheels are the result of over 89 years' experience in bonds and abrasives. United States Rubber Company engineers have so much experience and research data behind them that they can't be excelled when it comes to making the right wheel for the specific job, whether it's ordinary, unusual, or entirely new. "U.S." has made the performance of grinding wheels more economical and productive, and hence has increased worker output. Write to address below.

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need protection too!

If it's made of iron or steel,
and exposed to the elements,
remember to have it
Hot-Dip Galvanized—*sealed in zinc!*

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The World's Largest Job Galvanizing Plant
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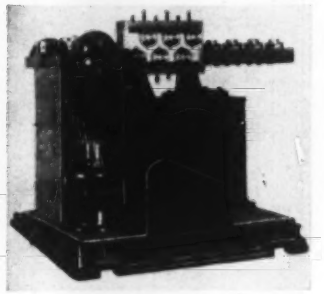
galvanizing . . . . pickling . . . . painting . . . . oiling

Unit Straightens Coil Ends

USE REPLY CARD—CIRCLE No. 1

Feed starter for straightening and feeding starter ends of rod from coil is an addition to the line of wire handling equipment made by Mettler Machine Tool Inc., New Haven, Conn. To operate, coil is



. . . feeds automatically through straightener

positioned where starter's power feed roll can get a bite on the extreme starting end. It then feeds rod automatically through attached roll straightener. When the straightened stock reaches pulling device on the next machine, feed rolls are backed off, letting second machine pull the rod through straightening rolls.

Feed rolls have two grooves to accommodate different diameters of wire to $\frac{5}{8}$-inch. For square stock, special rolls can be supplied. Feed rate is 68 inches per minute. Machine is driven by a $\frac{3}{4}$-hp motor, driving a speed reducer through V-belts.

Core Grinder Line Expanded

USE REPLY CARD—CIRCLE No. 2

Addition of the model 18 portable foundry core grinder to its standard line is announced by Milwaukee Foundry Equipment Division, Spo Inc., 6494 Grand Division Ave., Cleveland 25, O. Machine is designed to produce uniformly flat faces with unbroken edges and handle a large range of core sizes. Its 18-inch diameter grinding wheel is mounted on an adjustable head that locks firmly in any direction.

Maximum clearance between table and grinding wheel face is 18 inches; maximum working capacity is 15 x 24-inch core surface. To speed production, small cores can be mounted in multiples in gang fixtures. Model takes 3 x 5-

. . . uniform flat faces in large size range

foot floor space, 30 x 42-inch space for storage. Its 1-hp 220/440-v fully-enclosed motor drives the wheel 660 rpm.

Metal Forming Bulldozer

USE REPLY CARD—CIRCLE No. 3

Vertical die clamping cylinders are used in place of bolts to secure the pressure plate on a metal forming bulldozer introduced by Hufford Machine Works Inc., 1700 E. Grand Ave., El Segundo, Calif. Cylinders instantly release upon completing the operation to allow fast removal of the work and reloading for another cycle. To effect the vertical clamping, two 25-ton cylinders are mounted on a rolling assembly that can be positioned anywhere along the bulldozer bed. Each cylinder is controlled by a four-way selector switch.

For conventional bulldozing, when vertical die pressure cylinders are not required, vertical space is increased by unbolting and removing the overhead track and clamping unit. Threaded leadscrew type shipper rod provides sensitive control. Model 88 is rated at 150 tons.

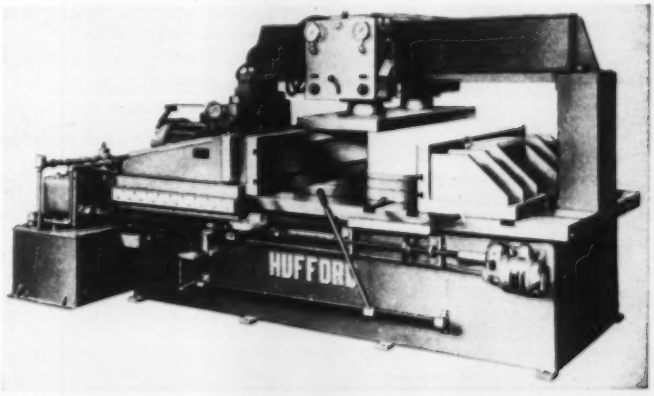
REPLY CARDS

on page 207 will bring you more information on any new products and equipment in this section.

Lift Performs Complex Handling

USE REPLY CARD—CIRCLE No. 4

Hamilton Tool Co., Hamilton, O., offers a scissor-type lift mechanism made for special requirements involving frequent and complex handling during processing operations. The units, called Portelvators, operate on track that skirts



. . . die clamping cylinders replace bolts to secure the pressure plate

Specify...
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for sound, clean welds!

(shown left)
WEIGER-WEED
Cold Formed
Offset Tip, Type D

W·W

Standard Replaceable
Cold Formed Offset
WELDING TIPS

Through the development of special cold forming equipment and methods, Weiger-Weed produces offset welding electrodes with these important advantages: . . .

- No loss of physical or electrical properties—cold formed offset tips have the same hardness and conductivity as straight tips.
- No distortion of taper—good electrical contact, no water leaks.
- Full cooling—water hole is as deep as in straight tips.
- Full workable nose length.
- Economy, quick delivery—most styles are formed quickly from standard straight tips.

Many other special cold formed electrodes to lick difficult clearance problems can be worked out by WW if quantities warrant the tooling. Give us the details of your problem.

W·W

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WEIGER-WEED & CO. Division of Fansteel Metallurgical Corp. • 11644 Cloverdale Avenue • Detroit 4, Michigan

the storage shelves and processing stations. They are moved manually, elevated electrically.

Lift mechanism is operated by 1-hp elevator-type motor through standard worm, worm gear and screw power transmission. Foot control from either end of table actuates the motor. Electrical controls include gear driven limit switch and reversing magnetic starter. Table size is 24 inches wide, 36 inches long. Lift raises 64 inches above floor level under maximum 600-pound load capacity in one minute.

Transformer Welder Redesigned

USE REPLY CARD—CIRCLE No. 5

Redesign of its atomic-hydrogen transformer welder to incorporate a hot-start circuit, silicone insulation, and extra-wide current range is announced by General Electric Co., Schenectady 5, N. Y. Current range on the redesigned model is 10 to 100 amp and results in use of one machine on all applications. Range is divided into two sections of 10 to 35 amps—each extending the entire length of the indicator scale to permit precise current settings.

Other advantages indicated are longer coil life because of the silicone insulation, faster starting with the hot-start circuit and a range switch to change from one current setting to another without moving the welding table. Features retained on the transformer include power factor correction capacitors, portable start-stop pushbotton, automatic gas shutoff and stepless current control. Welder operates on 60-cycle, single-phase voltage with a 75-amp rating.

Machine Chills 5 Cubic Feet

USE REPLY CARD—CIRCLE No. 6

Industrial chilling machine made to meet needs of small capacity users is announced by Sub-Zero Products Mfg. Division, Deepfreeze Distributing Corp., Cincinnati 29, O. At operating capacity of 5 cu ft, the model W-120 maintains temperatures as low as −120° F. At this temperature it removes 500 Btu's per hour—the equivalent of cooling 20 pounds of steel from room temperature to −120° F. By having the same thermal range as

ACCO products CHECK

☐ Shaped Wire*

— Flat
● Round
⧓ Odd contour

Low or high carbon, stainless, special alloy, Armco. You draw the shape—PAGE can draw the wire.

☐ Armature Banding Wire

Tinned stainless or carbon steel. In reels of 50 to 200 pounds. Stainless has high tensile strength, high resistance, low permeability.

☐ Lock Safety Wire

Tough, durable, workable. In the size and type for your work.

☐ Spring Wire

Any shape*... high carbon... hard drawn... high tensile... stainless... galvanized... tinned... bright.

*Cross-sectional areas up to .250" square; widths to ⅜"; width-to-thickness ratio not exceeding 6 to 1.

YOU do this—
Give us the specifications of the wire you need—or tell us details of job to be done.

WE'LL do this—
Send you recommendations, prices and delivery date. Samples on request. PAGE offers you a wide variety of wires to choose from.

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AMERICAN CHAIN & CABLE

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STANDING STILL

Foundry Type

Bailey

STATIONARY WHEEL
PIG CASTING MACHINES

Correctly designed for greater production . . . longer service

Increased casting capacity, reduced maintenance and operation costs—these are your benefits from the "stationary wheel" design of Bailey Pig Casting Machines. Bailey Machines feature large diameter idler wheels permanently mounted at intervals on the frame. Along these stationary flanged wheels runs an endless chain of moulds. Through this design 80% of the moving parts of conventional machines are eliminated, and the wheels are located as far as possible from casting heat.

Rugged in design and construction, Bailey Pig Casting Machines have been thoroughly proved by service in ferrous and non-ferrous smelters and foundries.

Blast Furnace Type

ENGINEERS

1221 BANKSVILLE ROAD PITTSBURGH 16, PA

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You've got to
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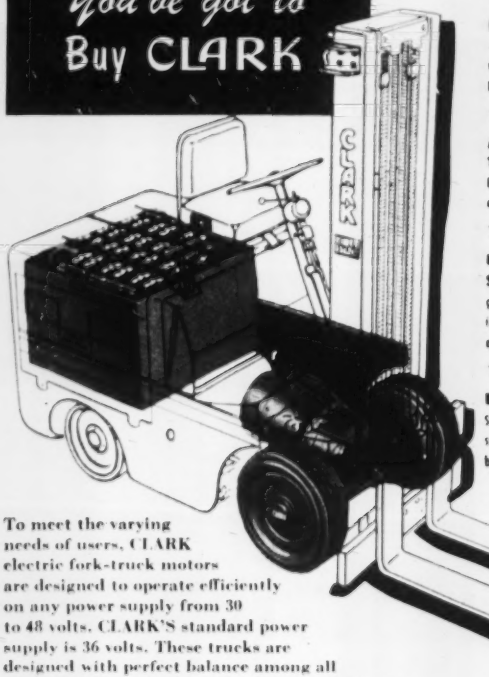
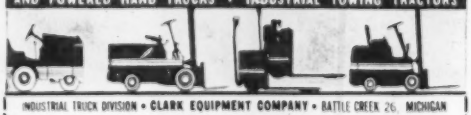


★
MOTOR—Designed for **CLARK** for the specific power requirements of industrial use. Fuses protect both motor and circuits against damage.
★
STEERING AXLE—Pivoted—all four wheels **always** on the ground; better traction, better steering, utmost stability.
★
DRIVE AXLE BY CLARK—Regular Hiway-Truck-Type Clark axle—the best that can be said of any axle.
★
AUTOMATIC ACCELERATION as employed on **CLARK** Electrics takes out the human error—**no jerking**—
★
DIRECTIONAL LEVER on **STEERING COLUMN**—greatly simplifies operation, increases maneuvering speed and fast getaway.
★
BRAKES—HYDRAULIC—Smooth, positive action for safe operation—ruggedly built for long-lived efficiency.

To meet the varying needs of users, CLARK electric fork-truck motors are designed to operate efficiently on any power supply from 30 to 48 volts. CLARK'S standard power supply is 36 volts. These trucks are designed with perfect balance among all components and incorporate a new method of motor winding which provides more efficiency than has ever been offered in an industrial truck motor . . . There have been many technical changes from year to year in CLARK machines, but there has never been any change in CLARK'S 30-year purpose to give you the best VALUE your money can buy—and there never will be.

CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS



INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 26, MICHIGAN
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City _____ Zone _____ State _____
AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

the company's larger units, this model is also applicable to two other major fields: Lengthening perishable tool life and saving time on shrink fit assembly work.

Conveyorized Inspection Table

USE REPLY CARD—CIRCLE No. 7

Illuminated table equipped with roller conveyors, made by Samual Olson Mfg. Co. Inc., 2423-25 Bloomingdale Ave., Chicago 47, Ill., is designed to minimize effort dur-

. . . minimizes effort during inspection

ing and after inspection. A unit consists of two inspection tables with a roller conveyor between. Fluorescent lights to illuminate both tables are mounted over the conveyor in a canopy-like structure that can serve as a shelf for rejected parts, tools or drawings. Each table has two electric outlets, plus a drawer for tools and instruments.

Parts for inspection brought to the tables on caster trucks that have roller beds, are rolled onto the conveyor without lifting. Units can be set end to end for an inspection line of any length. Work tables are made of plywood, reinforced by 2-inch planks and covered with linoleum.

Machine Marks Tough Surfaces

USE REPLY CARD—CIRCLE No. 8

Pneumatic marking machine developed by Jas. H. Matthews & Co., 3978 Forbes St., Pittsburgh 13, Pa., impresses a deep mark on tough metal surfaces without exerting extreme pressure and shock to parts and marking dies. Its use is also indicated where parts will not withstand pressure that is required to mark in one pass. When control switch at the side is set at reciprocating position, machine's

Wire Heat Treating Units *Scratchboard Drawing for Pittsburgh Steel Company by T. W. Hunter*

Progress in Steel

New Oil-Tempering Units Improve Wire Quality

In order to better serve steel users, Pittsburgh Steel Company includes in its Program of Progress the diversification of its line of products.

For example, the two oil-tempering units shown above have been installed to produce high-quality, oil-tempered spring wire. The new product is made by a closely controlled continuous process in which the wire is heated to a predetermined temperature, quenched quickly in a hot oil bath and then "tempered" by passing it through a bath of molten lead. This hardens and toughens the wire, increases its tensile strength—makes it suitable for mechanical springs such as those used in planes, tanks and jeeps, as well as in automobiles, trucks, diesel locomotives and agricultural equipment.

Pittsburgh Steel's policy of expanding its line of products as a part of its Program of Progress has extended into the field of flat rolled products. Last year, the Thomas Steel Company at Warren, Ohio was acquired, thus marking the entry of Pittsburgh Steel into the flat rolled product market. This year a new 66-inch continuous hot strip-sheet mill and a new 66-inch 4-stand, 4-high tandem cold reducing strip-sheet mill will go into operation at the Allenport Works. Another step in the Program of Progress—the new blooming-slabbing mill at the Monessen Works—has been completed. It is handling the increased flow of ingots coming from the enlarged open-hearth furnaces which this year will produce an extra half-million tons of steel. To help make this possible, blast furnace capacity is being increased by 100,000 tons a year.

The entire Program of Progress at Pittsburgh Steel is an important part of the steel industry's answer to the need for more and better steel to help defend the free world while still supplying reasonable civilian requirements.

Pittsburgh Steel Company

Pittsburgh, Pennsylvania

MID-WEST ABRASIVES

Photograph shows an action shot of the new MID-WEST AUTOMATIC SNAGGING GRINDER, (patented) used on the production line of a steel plant in Detroit.

MID-WEST'S smooth FIBER-CUSHIONED arbor holes are easier on • your OPERATOR • your GRINDING WHEEL • your MACHINE SPINDLE and BEARINGS • your WORK-PIECE • your PRODUCTION • your GRINDING COSTS.

Not only will Mid-West FIBER-CUSHIONED resinoid snagging wheels minimize the troubles so characteristic of snagging operations, but they're easier to mount, they're stronger, and they last longer.

The fiber-cushioned centers (a Mid-West Development) plus Mid-West's special resinoid bond, an extremely cool cutting bond, assures a highly satisfactory wheel life and increased production.

For complete information on these Fiber-Cushioned snagging wheels, write, wire or phone today.

MID-WEST ABRASIVE COMPANY

Executive Offices 510 South Washington St., Owosso, Michigan
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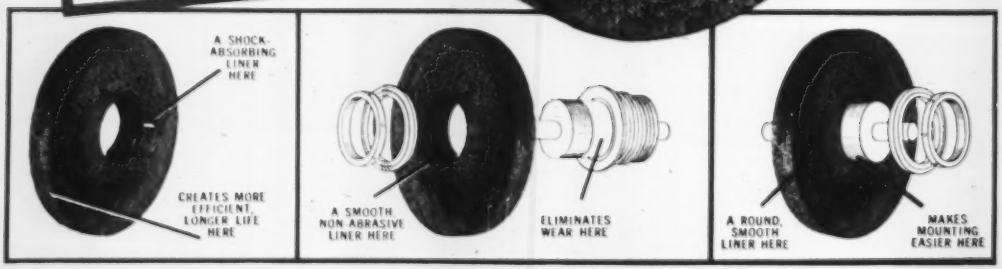
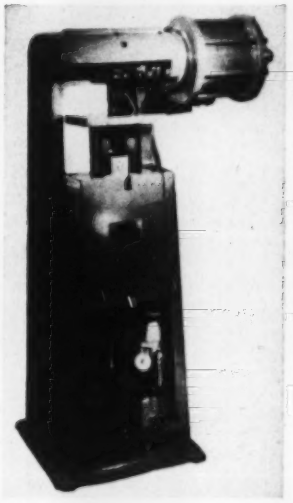
ABRASIVES


A SHOCK-ABSORBING LINER HERE
CREATES MORE EFFICIENT, LONGER LIFE HERE
A SMOOTH NON-ABRASIVE LINER HERE
ELIMINATES WEAR HERE
A ROUND, SMOOTH LINER HERE
MAKES MOUNTING EASIER HERE

head automatically passes marking die back and forth on the part until foot control pedal is released.

To compensate for additional depth necessary with each stroke, elevating table holding the part is kept under a constant air cushion adjustable to 6000 pounds maxi-



. . . impresses metal without extreme shock

mum pressure. With control switch set at standard position, automatic reciprocating action of microswitches is cut out and the unit marks with a single stroke. Machine operates on a minimum 100 psi air pressure and $\frac{3}{8}$-inch ID air feed line.

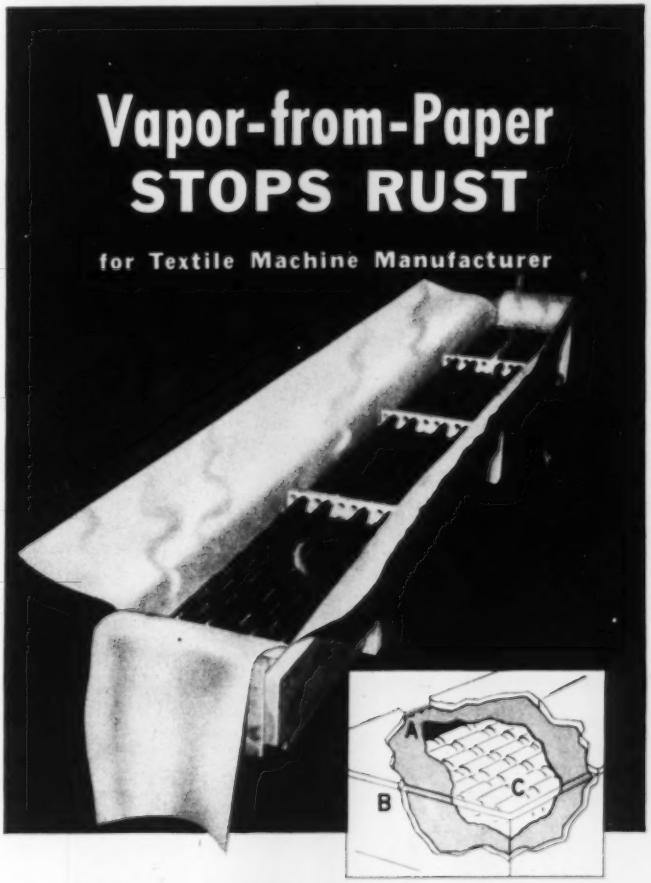
Recording Counter Chronograph

USE REPLY CARD—CIRCLE No. 9

Recording counter-chronograph that instantly transcribes data from electronic counter measurements up to 9000 per minute is announced by Potter Instrument Co. Inc., Great Neck, N. Y. Data is transferred by a direct process to electrically sensitive paper. The unit totalizes elapsed time in steps of 10 microseconds or less. A maximum 150 measurements per second can be recorded with a capacity of six digits for each. Paper is indexed intermittently after each measurement is recorded, merging into a continuous drive when recording rate exceeds 20 per second. Completed measurements are recorded on a continuous

Vapor-from-Paper STOPS RUST

for Textile Machine Manufacturer



HOW IT WORKS! Used here as a box liner, Angier VPI Wrap (A) gives off a vapor. This magic-like vapor permeates the area within box (B) to prevent rust of machine parts (C). Soco-Lowell Photo

Here, messy grease and oil coatings have had their day. Now, in only the time it takes to line a box, textile machine parts are ready to ship or store with no chance of rusting.

Angier VPI* Wrap gives off a vapor that protects for months on end. Because slushing is eliminated, customers are saved the time and trouble of "cleaning".

This vapor method of packaging already has been PROVEN more effective . . . more economical for protecting these products:

( ) Machinery - Industrial, Metal Working, Farm, Office, Construction. ( ) Steel in process of fabrication.
( ) Electrical Machinery, Appliances, Products. ( ) Instruments and clocks.
( ) Fabricated Products—Cutlery, Hardware, etc. ( ) Ordnance Equipment.
( ) Transportation Equipment—Aircraft, Auto, Naval, Railroad, etc. ( ) Others:

Check your product now. Send this with your letterhead to get VPI facts and name of Angier's distributor near you. Send today to the most experienced name in vapor rust preventives . . . Angier Corporation, Framingham 8, Massachusetts.

Angier

VPI* WRAP

* ® Vapor Rust Preventive

Visit our booth No. 141-143—Tool Engineers' Industrial Exposition—March 17-21

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Polished Raceway surface magnified 100 times as used in other ball bearings
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Raceway surface magnified 100 times, as used exclusively in Hoover Ball Bearings

It's the raceway that makes the difference

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America's only
BALL BEARING
with Honed Raceways

90% longer life
30% greater load
Amazing Quietness

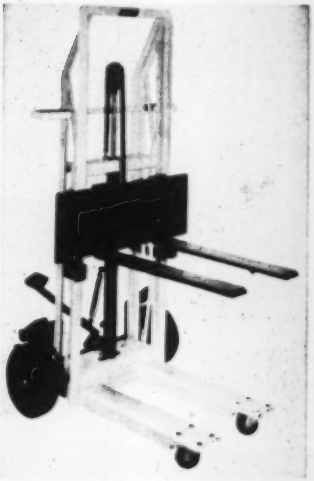
The Aristocrat of Bearings

roll of Teledeltos paper by a bank of styli.

Fork Lift Line Expanded

USE REPLY CARD—CIRCLE No. 10

Big Joe Mfg. Co., 184 N. Franklin St., Chicago 6, Ill., announces additions to its line of hydraulic foot-operated and electric fork lift trucks. Two models are made with maximum 52-inch height under



. . . built for foot or electric operation

800-pound loads. These are available as foot or hydraulic operated units. Two other trucks have maximum 66 and 78-inch height, powered electrically.

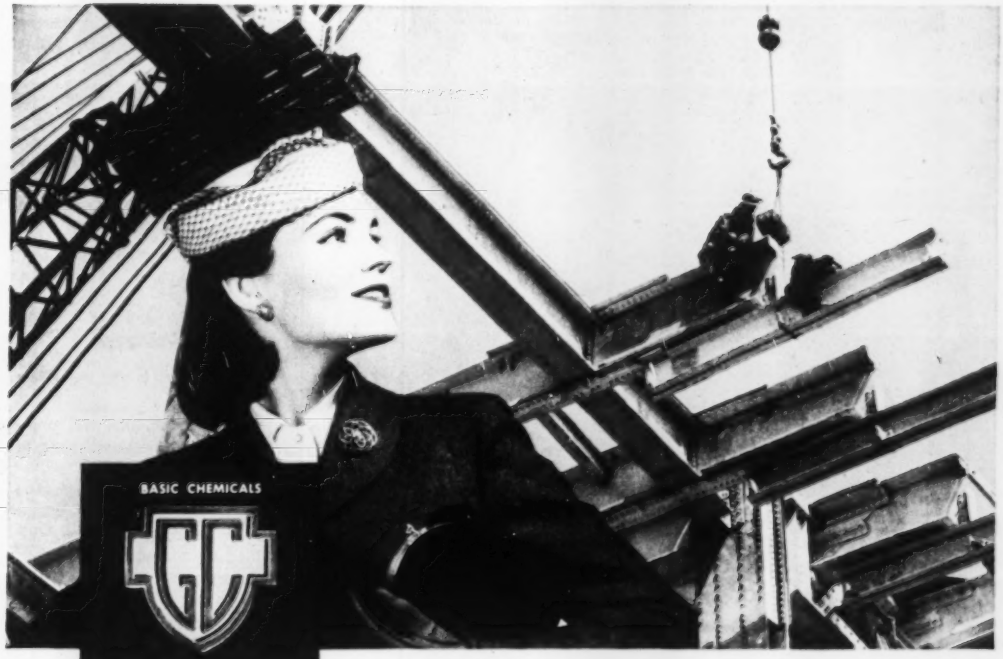
Each has heavy-duty recharging plant, and shock-proof power system controlled by a key-locked ignition. Adjustable forks accommodate a variety of skid sizes. Dual ball and roller bearings throughout all mechanisms cut down friction in operation. All units have the company's self-adjusting foot operated dual safety brakes and protected hand guard.

Wet Tool Grinder Redesigned

USE REPLY CARD—CIRCLE No. 11

Redesign of its straight wheel tool grinder is announced by Standard Electrical Tool Co., 2504 River Rd., Cincinnati 4, O. Available in 14, 16, 18 and 20-inch sizes, the grinder is suited for hogging or snag grinding carbide tool

METALS...*one of 187 industries served by General Chemical*



General Chemical Quality Products For the Metal Industry

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Copper Fluoride
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Iron Sulfide

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  Sodium Fluoride
- **PICKLING & DESCALING**
  Acetic Acid
  Fluoboric Acid
  Hydrofluoric Acid
  Muriatic Acid (Hydrochloric)
  Nitre Cake
  Nitric Acid
  Phosphoric Acid
  Sodium Bifluoride
  Sodium Fluoride
  Sulfuric Acid

ELECTROPLATING

Acetic Acid
Ammonia Alum
Ammonium Thiosulfate, Solution
Aqua Ammonia
Chromium Fluoride
Fluoboric Acid
Hydrofluoric Acid
Hydrogen Peroxide
Metal Fluoborate Solutions (Lead, Tin, Copper, Nickel, Iron, Cadmium, etc.)
Muriatic Acid (Hydrochloric)
Nitric Acid
Potash Alum
Sodium Bifluoride
Sodium Fluoride
Sodium Metasilicate
Stannous Chloride
Sulfuric Acid
Tetrasodium Pyrophosphate
Trisodium Phosphate

LIGHT METALS—Casting

Ammonium Fluoborate
Potassium Fluoborate
Sodium Fluoborate

HEAT TREATING

Barium Fluoride
Potassium Fluoride
Sodium Fluoride

ALKALI CLEANING

Aqua Ammonia
Sodium Metasilicate
Sodium Silicate
Tetrasodium Pyrophosphate
Trisodium Phosphate (TSP)

FINISHING

- **ELECTROLYTIC POLISHING**
  Acetic Acid
  Fluoboric Acid
  Hydrofluoric Acid
  Perchloric Acid
  Sulfuric Acid
- **BRIGHT DIPPING**
  Acetic Acid
  Hydrofluoric Acid
  Muriatic Acid (Hydrochloric)
  Nitric Acid
  Phosphoric Acid
  Sulfuric Acid
- **OXIDE FINISHING—ANODIZING**
  Hydrofluoric Acid
  Nitric Acid
  Oxalic Acid
  Sodium Silicate
  Sulfuric Acid
- **GALVANIZING AND TINNING**
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  Nitric Acid
  Sodium Fluoride
  Sulfuric Acid

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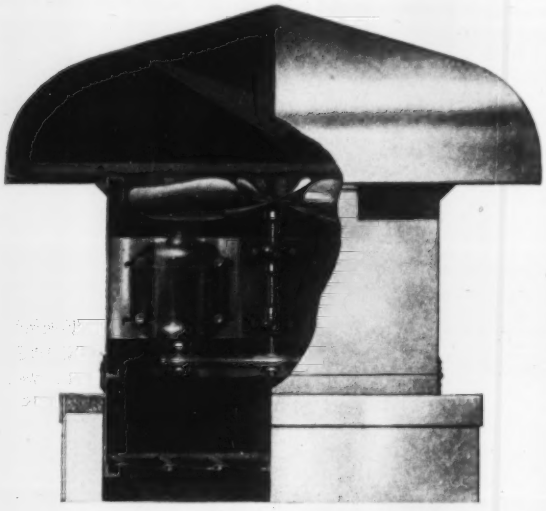


ANNOUNCING THE

BURT LOW TYPE FAN VENTILATOR

HIGHLY EFFICIENT • BIG CAPACITY
DIRECT OR BELT DRIVE • QUIET IN
OPERATION • QUICKLY ACCESSIBLE
EASILY INSTALLED • COMPLETELY
WEATHERPROOF • INCONSPICUOUS

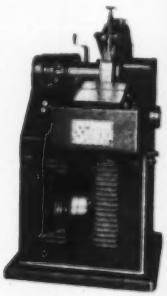
This new Burt ventilator is modern in engineering and design. Its efficient power-driven fan provides equally high capacity as an exhaust fan ventilator *or as a fresh air supply unit.* Its low, clean lines meet architectural requirements for an inconspicuous roof ventilator. Standard sizes include fans from 12" to 60" in diameter. Automatic or motor operated louver-type dampers may be used. See Sweet's for complete data on the Burt LOW TYPE FAN VENTILATOR or write us for Bulletin SPV-16.

FAN & GRAVITY VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES

The Burt Manufacturing Company

905 So. High St. Akron II, Ohio

shanks. Graduated tilting table, 10 x 10 inches, has renewable or double-life reversible table top wear plates. Adjustable nozzle and hand valve delivers coolant supply on the wheel and work without spray or splash. Coolant system includes a self-priming motor driven coolant pump with relief



. . . made for working carbide tool shanks

valve, large-area splash pan, combination settling chamber and reservoir.

Ball bearings are fully protected in large oil reservoir, with visual oil gage. Equipment includes positive shaft lock for use when changing the grinding wheel. V-belt drive has two-step speed with safety interlock to prevent over-speeding the wheel.

Unit Finishes Circular Parts

USE REPLY CARD—CIRCLE No. 12

Mechanical finishing machine, the DW 30-36-1SF, is added to the line made by Roto-Finish Co., Kalamazoo, Mich. Machine is designed to finish circular parts at minimum cost. It uses directional flow of finishing media to produce uniform results. Rubber lined compartment has an 18 cu ft capacity with large door opening to facilitate handling of large parts. Cam locks used for closing the compartment door have spring-loaded pressure releases that prevent excessive pressure build-up in the processing compartment.

All controls are located on one compact panel in the pushbutton operation. Automatic timer controls operation from 0 to 20 hours without operator's attention. Cylinder speed can be changed from 10 to 30 rpm through a variable speed power unit with a remote

Look alike?

YES... but one is of superior quality and costs less than 1/2 as much because of *Accurate* springmaking know-how!

Given a few machines and some wire, anyone can make springs . . . the difference comes in "know-how." And that's what we have to sell at Accurate.

A good example of how Accurate know-how can pay off is the history of the two springs illustrated above. One was made in two operations and required 100% inspection with rejects running as high as 50%. Accurate know-how developed the means of producing this spring *complete in one operation with such unvarying accuracy that inspection could be eliminated.* First cost is lower . . . overall cost is lower. If you require precision springs in quantity, we would welcome the opportunity to go over your needs with you and make recommendations. Write today.

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ASK FOR your complimentary copy of the Accurate Handbook of Technical Data on Springs. It's full of short cuts for making spring calculations.

Accurate Springs

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$70,000.00 in savings every year in Tool and Die Repair alone from only two Thomas Metalmasters in the world's largest cash register manufacturing plant.

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Terrific drop in scrap loss per man from $35.00 per man to $8.00 per man with the use of 14 Thomas Metalmasters in the world's largest Aircraft engine manufacturing plant.

With the Thomas Metalmaster Disintegrator you'll actually remove broken tap cores in minutes with no fuss—no bother—no toil . . . PLUS the fact that you'll not injure or effect the temper of the workpiece.

For technical information relative to metal disintegration via the TM way send for your copy of the Thomas Metalmaster Technical Bulletin published monthly in the interest of metal disintegration advancement. This is the only complete and reliable source on metal disintegration available in the world. Direct reports monthly of our findings and advancements right from our own complete Research Laboratories.

Write today on your company letterhead to

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21535 GROESBECK HIGHWAY
DETROIT 5, MICHIGAN

There's a factory trained technical engineer in your area ready to give you a free demonstration in your own plant.

control handle. Rotating cylinder shaft is mounted on 2⅞-inch self-aligning ball bearing pillow block.

Vibrator Line Expanded

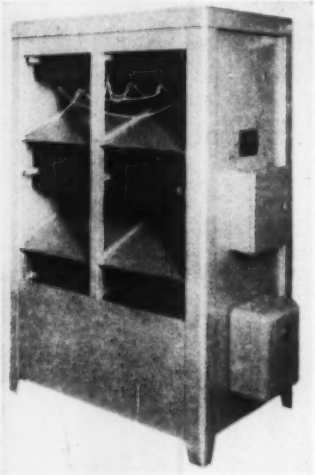
USE REPLY CARD—CIRCLE No. 13

Line of end-mounted quiet-type vibrators made by Cannon Vibrator Co., 1111 Power Ave., Cleveland 14, O., is expanded by addition of a 5-inch unit, the EM-5-QH. Its 55-pound piston has a 1⅝-inch stroke operating on a maximum 650 strokes a minute and 8-psi operating pressure. Air cushioned movement eliminates metal to metal pounding, achieving a relatively noiseless operation. Body has a hard chrome-plated cylinder wall. Hardened steel piston is centerless ground to precision tolerances. Slotted bolt holes in mounting plate facilitate mounting or removal.

Rectifier Turns Out 230-v DC

USE REPLY CARD—CIRCLE No. 14

Selenium rectifier that operates from standard three-phase alternating current power lines, turning out 230 v dc, is introduced by Electronic Rectifier Co. Inc., Rochester 2, N. Y. Unit's capacity is sufficient to run direct current motors to 25 hp, or energize electromagnets or other direct current equipment. Long life and absence of noise result from its having no moving parts to maintain or replace. It has overload and surge capacity to 600 per cent of normal rating. No time lag or warm-up period is required. The unit is self-contained, complete in one pressed steel cabinet 26 x 40 x 65 inches. It requires no external controls or panelboards. Other models are available for loads from 3 to 50 hp.



. . . runs direct current motors to 25 hp

Precision Pressure Regulator

USE REPLY CARD—CIRCLE No. 15

A precision pressure regulator developed by C. A. Norgren Co., Englewood, Colo., will give exact control of pressure in the range from 0 to 30 psi at 9 to 2 cfm. It is applicable to any process requiring air, nitrogen or other inert gases whose pressure must be precisely controlled. Unit has a built-in relieving feature that prevents build-up of excessive pressure.

Removes Carbon Deposits

USE REPLY CARD—CIRCLE No. 16

Magnus Chemical Co., Garwood, N. J., introduces 751 cleaner for removing carbonaceous deposits from tubes of fuel oil heaters without need for dismantling the equipment. Cleaning is accomplished by exposing deposit on tubes to action of the cleaner.

Tool Countersinks ⅜-Inch Hole

USE REPLY CARD—CIRCLE No. 17

Airmatic countersink, made by Cleco Division, Reed Roller Bit Co., Houston, Texas, will countersink a ⅜-inch hole in 75-ST aluminum in 9 seconds and will be comparable service in 27-ST aluminum and alloy steels. It is self-supporting. Device has only two controls, one for clamping the tool to the work and one for rotation.

Gouging, Chamfering Electrode

USE REPLY CARD—CIRCLE No. 18

An electrode designed for gouging, chamfering, cleaning and partial milling operations on any metal or alloy is announced by Eutectic Welding Alloys Corp., Flushing, N. Y. Known as Chamfer-Trode, it has a heavy coating that forms a cone at the striking end of the electrode, providing a natural jet effect arc. An intense,

THE WIRE WITH THE **Perfect Temper**

Many a production man thinks Chase engineers are "angels" for producing wire that unwinds from the coil smoothly and without twist. It's uniform in gauge, temper and color; has superior heading or flowing characteristics.

There's a Chase wire for most applications. Write for *FREE* booklet—"Chase Cold Heading Extruded Brass and Copper Alloy Wire" giving physical and fabrication properties, applications, weights per 1000 feet and feet per lb.

CMP orders. We can make favorable mill deliveries on authorized Controlled Materials orders. In many cases our warehouses can ship from stock. Your inquiries are invited.

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Our metallurgical engineers are familiar with military specifications for brass and copper for ordnance components, and will be glad to consult with you on the selection of these metals for defense orders.

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QUALITY REAMED HOLES *Plus* LOW MAINTENANCE, OPERATING COST

This new design offers greater end-cutting strength and blade support. Blade mounting provides cutting rigidity equivalent to solid flute design, plus extended life through replaceable blades.

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concentrated source of heat is created that removes unwanted metal of all types quickly so that the metal itself remains cool.

Nonclog Filter Bag

USE REPLY CARD—CIRCLE No. 19

National Super Service Co. Inc., Toledo, O., has developed a heavy duty suction cleaner filter bag that will not clog and is not destroyed by acids and destructive chemicals. It is made of a porous, clog and chemical resisting fabric.

Rods for Welding Aluminum

USE REPLY CARD—CIRCLE No. 20

Identified as X43S, aluminum rods developed by All-State Welding Alloys Co. Inc., White Plains, N. Y., are applicable with alternating or direct current electric welding equipment and oxyacetylene welding equipment. Standard diameters include 1/16, 3/32, 1/8, 3/16 and 1/4-inch; length is 36 inches.

Choker Sling Fitting

USE REPLY CARD—CIRCLE No. 21

Electroline Co., Chicago 9, Ill., offers a choker sling fitting that uses two overlapping and co-acting hooks that can be applied to a wire rope to form a loop of any size. Rope cannot be freed from sling until both hooks are disengaged manually. Hooks are joined to fitting portion of choker sling fitting by a pivot which allows the unit to conform automatically to size of the load.

Cable for Control Circuits

USE REPLY CARD—CIRCLE No. 22

Bailey Meter Co., Cleveland 10, O., introduces Armortube cable, a flexible, protected multi-tube transmission line for pneumatic and hydraulic control circuits. It is made up of 1/4-inch OD aluminum or copper tubing gathered in a slow

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REPLY CARD
Just circle the corresponding number of any item in this section for more information.

INFORMATION

AVAILABLE FOR THE ASKING

71. Aircraft Cable & Fittings

Macwhyte Co.—Complete specifications conforming to the latest Military specifications are shown for Hi-Fatigue control cables for aircraft, Safe-Lock and Socketype terminals and assemblies in illustrated revised edition of "Aircraft Cable, Terminals and Assemblies." Ask for catalog No. A-2.

72. Air Cleaner-Dryer

Hankison Corp.—The model B-30 Condensifier is a device that cleans and dehydrates compressed air for operating instruments. Bulletin B-30 explains how this unit combines mechanical filter, dehydrator and automatic trap in compact assembly to remove entrained and vaporized water as well as oil, sludge, scale and other foreign materials from air. Rated capacity is 30 cfm at 100 psi.

73. Package Banding

Guide Co. — Details of two new machines for automatically bundling and reinforcing packaging are presented in 4-page illustrated bulletin "Now! Better and Faster Banding—Bundling — Reinforcing." Equipment applies pressure-sensitive filament tapes.

74. Electroanalysis of Copper

Eberbach Corp.—20-page manual outlines methods for analysis of copper and lead by electroanalysis. Methods and bibliography are a product of Battelle Memorial Institute research.

75. Space Heaters

Fageol Heat Machine Co. — Designed to "heat men at work, not empty spaces," fireless Fageol Heat Machines are for use in factories, warehouses, foundries, etc. As described in 6-page brochure L-4782, these portable machines spray heated air across floor or ground areas. They have attached fuel oil tank and require only plugging into 110-v outlet for operation. Outputs are 140,000 and 180,000 Btu.

76. Speed Reducers

Winsmith, Inc. — Custom applications calling for speed reducers can be served by Winsmith standardized line of components assembled from stocked parts into a standard unit. Pocket-size folder covers four basic designs made in ratings up to 85 hp; differential, worm gear, helical gear and worm-helical reducers.

77. Composition Disk Valves

Fairbanks Co. — Briefly described and illustrated in 4-page folder is line of renewable composition disk globe and angle valves, lift checks, spring loaded check valves and stop and check valves. Valve size and disk guide information is tabulated.

78. Induction Heating Machine

General Electric Co.—4-page illustrated bulletin GEA-5682 describes features, applications and specifications of a new heat-treating machine which is to be used with either motor-generator type heaters for hardening or annealing selected areas of up to 3-in. diameter and 40-in. long parts.

79. Hand & Electric Lifters

Economy Engineering Co. — Nineteen applications of Economy hand or electric powered hoists are shown in 4-page illustrated bulletin 48-A. Capacities up to 5000 lb are available for die handling, loading trucks, stacking skids, tiering pallets, etc.

STEEL 3-10-52
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80. Engineered Devices

Jack & Heintz, Inc.—24-page illustrated booklet "Jack & Heintz Does It" contains examples of electrical, hydraulic and mechanical devices made by company for products varying from washing machines to guided missiles. Theme that doing the unusual is routine is stressed, and engineering, development and production facilities are outlined.

81. Servomechanisms

Minneapolis - Honeywell Regulator Co., Brown Instruments Div. — 24-page booklet No. G-56 discusses servomechanism techniques for improved process control and more economical process design. Basic information on new approach to analysis of automatic control problems in industrial process instrumentation.

82. Analyzing Instrument

Fisher Scientific Co.—16-page illustrated booklet "The Nefluoro-Photometer" describes an electronic-optical instrument which provides a rapid and accurate means for analyzing a wide range of organic, inorganic, synthetic and biological chemicals. It combines the principles of colorimetry, nephelometry and fluorometry in single instrument.

83. Wire Straightener

Medart Co.—Either cold-finished or hot-rolled stock can be handled by Supermatic self-feeding, automatic wire straighteners and cutoff machines described in 4-page illustrated form 52-A. Machines cover wire size range from 1/16 to 1 in. at throughput speeds of up to 200 fpm. On hot-rolled stock, scale removal is virtually automatic.

84. Cemented Tungsten Carbide

Greenleaf Corp.—You'll find complete listing of standard and special cemented tungsten carbides for machining steel, cast iron, nonferrous metals and nonmetallics in 16-page catalog 108. Written in semitechnical terms, booklet provides complete data on standard blanks, standard tools, adjustable clamp tools, carbide milling, cutting and grinding and prices.

85. Materials Handling Pallet

National Pallet Corp. — Uses and applications of hardwood pallets for every phase of materials handling are comprehensively covered in 16-page booklet "National Pallets." Job engineered and standard types are illustrated with suggested uses, load limits and other data. Also stressed are advantages of selecting pallets from single source of supply.

86. Steel & Aluminum Windows

Michael Flynn Mfg. Co.—The 1952 Lupton Metal Window catalog gives complete details of extensive line of steel and aluminum windows for commercial, residential and industrial buildings. Contained in this 37-page book are instructions for double glazing and screening, selection data and complete dimensions.

87. Film Type Heaters

Electrofilm Corp.—Uses and method of application as well as mechanical, thermal and electrical characteristics of film type heating elements are covered in company brochure. Material is an electrically conductive plastic with uniform heat distribution.

EDITORIAL REPRINTS:

88. Cut Out The Noise

When steel meets steel, there's bound to be noise. If you're interested in reducing ear-splitting sounds for more efficiency in your plant, send for reprint of C. E. Crede's article in Feb. 25 STEEL entitled "Toned-Down Noise Tunes up Operations." Discussed are many causes and remedies for unnecessary clang and clatter in metalworking operations.

89. Strip Handling Methods

Many methods lend themselves to speedier processing of both coiled and sheared steel strip. Handling costs as well as waste and scrap losses drop when using the right machines. If you care to know more about these methods and machines, send for illustrated reprint entitled "More Zip for Strip Handling" taken from Feb. 18 issue of STEEL.

90. Reducing Tooling Costs

Have tooling costs skyrocketed because of rising demand for jigs and tools to help unskilled labor produce acceptable finished parts? If so, you'll be interested in one British equipment designer's methods for reducing costs. These include using steel shapes for clamps, bodies and attachments, welding of components and using fasteners, cold rolled steel bars and drill rod. Request STEEL reprint, "Tooling Can Be Cheaper."

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continuous spiral. A tube bundle is wrapped in water-repellent insulating tape, then encased in heavy rust resistant, galvanized steel strip like that used for BX electrical cable.

Check-Valve Couplings

USE REPLY CARD—CIRCLE No. 23

Quick-Seal hose couplings, introduced by Robb Mfg. Co., Pittsburgh, Pa., are leak-proof at 0 psi and the higher the pressure, the tighter the seal. An interior rubber packer eliminates the possibility of leaks. Units are available in brass, bronze, aluminum, stainless steel and other steel specifications. They are made in sizes $\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{2}$, 2 and 3 inches, either theaded or with barbed shanks for hose. They are made in single and double-check types and are interchangeable in the same size.

Lightweight Electric Connectors

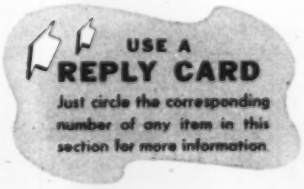
USE REPLY CARD—CIRCLE No. 24

Design of a lightweight connector offered by Titeflex Inc., Newark, N. J., eliminates clamps, saves space, facilitates harness assembly and permits easy changes in wiring arrangements. It is available in 17 shell sizes, conforming to AN sizes 8-36 inclusive.

Piercing Punches

USE REPLY CARD—CIRCLE No. 25

Porter Precision Products, Cincinnati 31, O., announces additions to its line of 3-P standard piercing punches. Line offered in 21,000 stock sizes in a variety of select tool steels, properly hardened and precision ground. Head of punch offers more resistance area against piercing pressure, eliminating the necessity of hardened backing plates. Die bushings, with taper relief, are available from stock in any 0.001-inch increment of size.



30% PRODUCTION SAVINGS... with Jewel Brand Coated Abrasives!

BY SWITCHING TO JEWEL BRAND resin bonded abrasive belts, a manufacturer of cold rolled steel boxes for tools, first aid kits, electronic parts and similar equipment, made production savings of 30% in removing welding beads.

SAVINGS LIKE THESE are possible because properly chosen Jewel Brand Belts cut faster, last longer. And all Jewel Brand Coated Abrasive Belts have the exclusive *Velvet Joint* that eliminates bumping, adds many hours of productivity.

HELP YOURSELF TO SIMILAR SAVINGS by making the simple Waste Barrel Test. Send us a letter size sample (preferably including the joint) of a used belt taken from your waste barrel. In most cases, Jewel Brand Engineers can recommend a Jewel Brand Coated Abrasive Belt that will save time and money for you! No obligation of any kind.

Fill in coupon and send with used belt sample.

ABRASIVE PRODUCTS, INC.
511 Pearl Street
South Braintree 85, Mass.

Sure, we want to cut production costs! Enclosed is sample of used belt from our plant.

NAME _____

POSITION _____

COMPANY _____

TYPE OF PRODUCT _____ MATERIAL _____

WE USE APPROXIMATELY _____ BELTS PER MONTH _____

BELT LENGTH _____ BELT WIDTH _____

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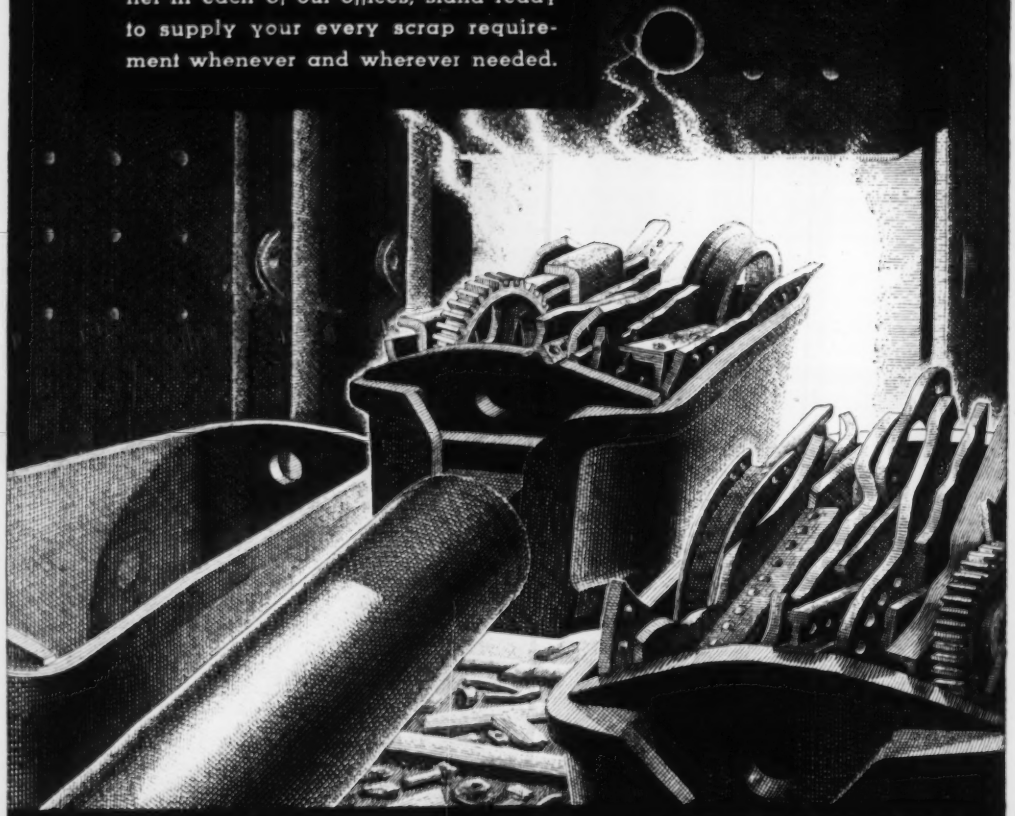
The facilities and experienced personnel in each of our offices, stand ready to supply your every scrap requirement whenever and wherever needed.



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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

The Market Outlook

MORE DECONTROLS on steel and other metals are in the making.

Coming soon are decontrols on steel mill secondary products, those which are not of prime quality. By mid-year, all light flat-rolled steel products may be decontrolled, government controllers reveal. In the Washington offices of the National Production Authority you would be given a sporting chance if you bet a few dollars that all steel products will be out from under controls by next Jan. 1.

A GOOD BET—If Washington is considering decontrols you can bet the need for them has risen already, for the ponderousness of the federal government makes a lag in action unavoidable. Also, the government is reluctant to relinquish controls, both because of the trend toward extension of federal controls and because the controllers want to make sure the justifications for decontrol are more than temporary.

Authority for the report that secondary steel will be decontrolled very shortly is Herbert Johnson, chief of NPA's iron and steel division. He explains that steel users are reluctant to cash their Controlled Materials Plan tickets for secondary material when they can get better quality. An initial move in recognition of this was NPA's establishment last week of three new classifications of irregular or off-grade tin plate and terne plate to help move large quantities of off-quality material backing up at mills.

EASE-UP—Frank T. McCue, assistant director of NPA's iron and steel division, told a house committee that "we have at least nine months to go before controls on steel can be lifted." That means there's a possibility of a lifting of steel controls around Jan. 1. Mr. McCue believes that in the meantime the nation's output of finished steel will rise to a record-breaking 84.3 million tons in 1952, compared with 78.9 million tons in 1951. This, NPA men think, will permit liberalization of allotments of steel that remains under controls.

A few weeks ago chrome stainless steel was decontrolled. Now the trend toward a balance between demand and supply of steel and other metals is reflected by release by the Defense Production Administration of 30 million pounds of aluminum, largely sheet, and 20 million to 25 million pounds of brass, largely sheet, for supplemental allotments for second quarter. Further increases in these supplements are possible by April.

FREE TICKETS—Washington controllers are inviting civilian manufacturers to apply for tickets for additional steel. At the same time, some consumers are returning second-quarter CMP tickets.

Easiness has penetrated the steel market far enough to begin influencing attitudes of steel company scrap buyers. They're insisting on getting the grades they specify; they're showing further sensitivity to the market. A Detroit mill sent scrap brokers a letter warning them not to go long on its account. Demand for cast scrap continues slow, and in some areas there are no buyers at any price.

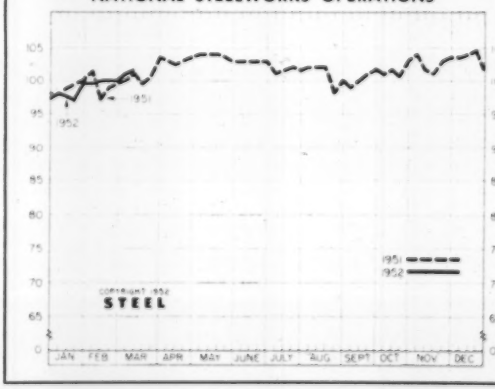
The degree to which demand for steel has eased varies with the product. Tightest in supply continue to be heavy plate, hot-rolled and cold-rolled carbon bars, wide flange structural shapes and galvanized sheets. The latter show promise of easing from a somewhat better supply of zinc.

Warehouses report an improvement in receipts of steel, particularly flat-rolled, but stocks still are unbalanced.

RECORD BREAKER—To fill orders already on the books, mills set an alltime production record in the week ended Mar. 8. They poured about 2,110,000 net tons of steel for ingots and castings, and pushed STEEL's operations rate up ½ point to 101.5 per cent of capacity.

PRICES—Except for easing in prices of cast scrap, all iron and steel prices remain at ceilings. STEEL's weighted index on finished steel holds at 171.92 while the arithmetical price composite is $106.32. Pig iron composites are unchanged at $52.54 on No. 2 foundry, $52.16 on basic, and $53.27 on malleable. The steelmaking scrap composite is unchanged at $43.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Mar. 8	Change	Same Week 1951	Same Week 1950
Pittsburgh	104	+ 1.5*	101	52
Chicago	103.5	— 0.5	105.5	86.5
Mid-Atlantic	98	0	99.5	61
Youngstown	105	0	106	50
Wheeling	100	— 0.5	96	89
Cleveland	98	— 3	103	93.5
Buffalo	101	0	104	93.5
Birmingham	104	0	78	55
New England	99	+ 8	99	66
Cincinnati	92	+ 3	102	89
St. Louis	79	— 6.5	...	84.5
Detroit	101.5	— 2*	108	98
Western	103	— 3	103.5	81
Estimated national rate	101.5	+ 0.5	101	69

Based on weekly steelmaking capacity of 2,077,040 tons in 1952; 1,999,034 tons for 1951; 1,928,721 tons for second half, 1950; 1,906,268 tons for first half, 1950.

* Change from revised rate for preceding week.

The Metalworking Outlook—p. 69 Production-Engineering News—p. 105

Composite Market Averages

FINISHED STEEL INDEX, Weighted:

	Mar. 6 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Index (1935-39 av. = 100)	171.92	171.92	171.92	171.92	118.67
Index in cents per lb.	4.657	4.657	4.657	4.657	3.215
ARITHMETICAL PRICE COMPOSITES					
Finished Steel, NT	$106.32	$106.32	$106.32	$106.32	$69.73
No. 2 Fdry. Pig Iron, GT	52.54	52.54	52.54	52.54	30.17
Basic Pig Iron, GT	52.16	52.16	52.16	52.16	29.56
Malleable Pig Iron, GT	53.27	53.27	53.27	53.27	30.79
Steelmaking Scrap, GT	42.00	42.00	43.00	44.00	34.33

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39: Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

† Preliminary

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Mar. 6 1952	Week Ago	Month Ago	Year Ago	5 Yrs Ago
Bars, H.R., Pittsburgh	3.70	3.70	3.70	3.70	2.60
Bars, H.R., Chicago	3.70	3.70	3.70	3.70	2.60
Bars, H.R., del. Philadelphia	4.223	4.223	4.223	4.18	2.98
Bars, C.F., Pittsburgh	4.55	4.55	4.55	4.55	3.20
Shapes, Std., Pittsburgh	3.65	3.65	3.65	3.65	2.50
Shapes, Std., Chicago	3.65	3.65	3.65	3.65	2.50
Shapes, del. Philadelphia	3.918	3.918	3.918	3.90	2.64
Plates, Pittsburgh	3.70	3.70	3.70	3.70	2.65
Plates, Chicago	3.70	3.70	3.70	3.70	2.65
Plates, Coatesville, Pa.	4.15	4.15	4.15	4.15	2.80
Plates, Sparrows Point, Md.	3.70	3.70	3.70	3.70	2.65
Plates, Claymont, Del.	4.15	4.15	4.15	4.15	2.80
Sheets, H.R., Pittsburgh	3.60-75	3.60-75	3.60-75	3.60-75	2.50
Sheets, H.R., Chicago	3.60	3.60	3.60	3.60	2.50
Sheets, C.R., Pittsburgh	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Chicago	4.35	4.35	4.35	4.35	3.20
Sheets, C.R., Detroit	4.55	4.55	4.55	4.55	3.35
Sheets, Galv., Pittsburgh	4.80	4.80	4.80	4.80	3.55
Strip, H.R., Pittsburgh	3.75-4.00	3.75-4.00	3.75-4.00	3.75-4.00	2.50
Strip, H.R., Chicago	3.50	3.50	3.50	3.50	2.50
Strip, C.R., Pittsburgh	4.65-5.35	4.65-5.35	4.65-5.35	4.65-5.35	3.20
Strip, C.R., Chicago	4.90	4.90	4.90	4.90	3.30
Strip, C.R., Detroit	4.85-5.60	4.85-5.60	4.85-5.60	4.85-5.60	3.35
Wire, Basic, Pittsburgh	4.85-5.10	4.85-5.10	4.85-5.10	4.85-5.10	3.425
Nails, Wire, Pittsburgh	5.00-6.20	5.00-6.20	5.00-6.20	5.00-6.20	4.125
Tin plate box, Pittsburgh	$8.70	$8.70	$8.70	$8.70	$5.75

SEMIFINISHED

Billets, forging, Pitts. (NT)	$66.00	$66.00	$66.00	$66.00	$50.00
Wire rods, ⅜-⅝", Pitts.	4.10-30	4.10-30	4.10-30	4.10-30	2.675

PIG IRON, Gross Ton

Bessemer, Pitts.	$53.00	$53.00	$53.00	$53.00	$31.00
Basic, Valley	52.00	52.00	52.00	52.00	30.00
Basic, del. Phila.	56.61	56.61	56.61	56.39	32.01
No. 2 Fdry., Pitts.	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Chicago	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Valley	52.50	52.50	52.50	52.50	30.50
No. 2 Fdry., Del. Phila.	57.11	57.11	57.11	56.89	32.51
No. 2 Fdry., Birm.	48.88	48.88	48.88	48.88	26.88
No. 2 Fdry., Birm., del. Cin.	55.49	55.49	55.49	55.58	31.75
Malleable, Valley	52.50	52.50	52.50	52.50	30.50
Malleable, Chicago	52.50	52.50	52.50	52.50	30.50
Charcoal, Lyles, Tenn.	66.00	66.00	66.00	66.00	37.50
Ferromanganese, Etna, Pa.	188.00	188.00	188.00	188.00	140.25

† F.o.b. cars, Pittsburgh.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt., Pitts.	$44.00	$44.00	$44.00	$45.00	$35.00
No. 1 Heavy Melt., E. Pa.	42.50	42.50	42.50	43.50	35.50
No. 1 Heavy Melt., Chicago	42.50	42.50	42.50	43.50	32.50
No. 1 Heavy Melt., Valley	44.00	44.00	44.00	45.00	35.00
No. 1 Heavy Melt., Cleve.	43.00	43.00	43.00	44.00	32.50
No. 1 Heavy Melt., Buffalo	43.00	43.00	43.00	44.00	35.00
Rails, Rerolling, Chicago	52.50	52.50	52.50	52.50	38.50
No. 1 Cast, Chicago	49.00†	49.00†	49.00†	49.00†	42.50

† F.o.b. shipping point.

COKE, Net Ton

Beehive, Furn. Connsvl.	$14.75	$14.75	$14.75	$14.75	$8.75-$9
Beehive, Fdry., Connsvl.	17.50	17.50	17.50	17.50	9.75-11.00
Oven, Fdry., Chicago	23.00	23.00	23.00	21.00	15.10

NONFERROUS METALS

Copper, del. Conn.	24.50	24.50	24.50	24.50	19.50-20.50
Zinc, E. St. Louis	19.50	19.50	19.50	17.50	10.50
Lead, St. Louis	18.80	18.80	18.80	16.80	13.80
Tin, New York	121.50	121.50	121.50	182.00	70.00
Aluminum, del.	19.00	19.00	19.00	19.00	15.00
Antimony, Laredo, Tex.	50.00	50.00	50.00	42.00	28.25
Nickel, refinery, duty paid	56.50	56.50	56.50	59.50	35.00

PIG IRON

F.o.b. furnace prices quoted under GCPR as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax. Key to producing companies published on second following page.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$54.00	$54.50	$55.00	$55.50
Brooklyn, N.Y., del.		59.18	59.68	
Newark, del.	56.87	57.37	57.87	58.37
Philadelphia, del.	56.61	57.11	57.61	58.11
Birmingham District				
Alabama City, Ala. R2	48.38	48.88		
Birmingham, R2	48.38	48.88		
Birmingham, S9	48.38	48.88		
Woodward, Ala. W15	48.38	48.88		
Cincinnati, del.		55.49		
Buffalo District				
Buffalo, R2	52.00	52.50	53.00	
Buffalo, H1	52.00	52.50	53.00	
Tonawanda, N.Y., W12	52.00	52.50	53.00	
No. Tonawanda, N.Y. T8		52.50	53.00	
Boston, del.	62.11	62.61	63.11	
Rochester, N.Y., del.	54.88	55.38	55.88	
Syracuse, N.Y., del.	55.91	56.41	56.91	
Chicago District				
Chicago, I-3	52.00	52.50	52.50	53.00
Gary, Ind., U5	52.00		52.50	
Indiana Harbor, Ind., I-2	52.00		52.50	
So. Chicago, Ill., W14	52.00	52.50	52.50	
So. Chicago, Ill., Y1	52.00	52.50	52.50	
So. Chicago, Ill., U5	52.00		52.50	53.00
Milwaukee, del.	54.06	54.56	54.56	55.06
Muskegon, Mich., del.		58.47	58.47	
Cleveland District				
Cleveland, A7	52.00	52.50	52.50	53.00
Cleveland, R2	52.00	52.50	52.50	
Akron, O., del. from Cleve.	54.61	55.11	55.11	55.61
Lorain, O., N3	52.00			53.00
Duluth, I-3			52.50	
Erie, Pa., I-3	52.00	52.50	52.50	53.00
Everett, Mass., E1		57.50	58.00	
Fontana, Calif., K1	58.00	58.50		
Seattle, Tacoma, Wash., del.		60.66		
Portland, Oreg., del.		60.66		
Los Angeles, San Francisco, del.	60.16	60.66		
Granite City, Ill., G4	53.90	54.40	54.90	
St. Louis, del. (exc. tax)	54.66	55.16	55.66	
Ironton, Utah, C11	52.00	52.50		
Geneva, Utah, C11	52.00	52.50		
Lone Star, Tex., L6	48.00	*48.50	48.50	
Minnequa, Colo., C10	54.00	55.00	55.00	
Pittsburgh District				
Neville Island, Pa., P8		52.50	52.50	53.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.		53.80	53.80	54.30
McKees Rocks, del.		53.54	53.54	54.04
Lawrenceville, Homestead, McKeesport, Monaca, del.		54.07	54.07	54.57
Verona, del.		54.57	54.57	55.07
Brackenridge, del.		54.82	54.82	55.32
Bessemer, Pa., U5	52.00		52.50	53.00
Clairton, Rankin, So. Duquesne, Pa., U5	52.00			
McKeesport, Pa., N3	52.00			53.00
Monessen, Pa., P7	54.00			
Sharpsville, Pa., S6			52.50	53.00
Steelton, Pa., B2	54.00	54.50	55.00	55.50
Sweedland, Pa., A3	56.00	56.50	57.00	57.50
Toledo, O., I-3	52.00	52.50	52.50	53.00
Cincinnati, del.	57.47	57.97		
Troy, N.Y., R2	54.00	54.50	55.00	55.50
Youngstown District				
Hubbard, O., Y1	52.00	52.50	52.50	
Youngstown, Y1	52.00	52.50	52.50	
Youngstown, U5	52.00			53.00
Mansfield, O., del.	56.66	57.15	57.15	57.65

* Low phos., southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50%, no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.50 for each 0.5% Si)

Jackson, O., G2, J1	$62.50
Buffalo, H1	63.75

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for each 0.045% max. P)

Niagara Falls, N.Y., P15	$88.00
Keokuk, Iowa, Openhearth & Fdry., frt. allowed K2	92.50
Keokuk, OH & Fdry., 12½ lb. pigets, 1½% Si, frt. allowed K2	95.50
Wenatchee, Wash., O.H. & Fdry., frt. allowed K2	92.50

CHARCOAL PIG IRON, Gross Ton

(Low phos semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn., T3	$66.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$57.00
Steelton, Pa., B2	60.00
Philadelphia, delivered	63.37
Troy, N.Y., R2	60.00

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Semifinished and Finished Steel Products

Mill prices quoted under GCPR as reported to STEEL, Mar. 6, 1952; cents per pound except as otherwise noted. Changes shown in Italics. Code numbers indicate following mill points producing company; key on next two pages

INGOTS, Carbon, Forging (NT)
Fontana,Calif. K1 ... $72.00
Munhall,Pa. U5 ... 52.00

INGOTS, Alloy (NT)
Detroit R7 ... $54.00
Fontana,Calif. K1 ... 80.00
Houston,Tex. S5 ... 62.00
Midland,Pa. C18 ... 54.00
Munhall,Pa. U5 ... 54.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ... $56.00
Clairton,Pa. U5 ... 56.00
Ensley,Ala. T2 ... 56.00
Fairfield,Ala. T2 ... 56.00
Fontana,Calif. K1 ... 75.00
Gary,Ind. U5 ... 56.00
Johnstown,Pa. B2 ... 56.00
Lackawanna,N.Y. B2 ... 56.00
Munhall,Pa. U5 ... 56.00
So.Chicago,Ill. U5 ... 56.00
So.Duquesne,Pa. U5 ... 56.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ... $66.00
Buffalo R2 ... 66.00
Canton,O. R2 ... 66.00
Clairton,Pa. U5 ... 66.00
Cleveland R2 ... 66.00
Conshohocken,Pa. A3 ... 73.00
Detroit R7 ... 69.00
Ensley,Ala. T2 ... 66.00
Fairfield,Ala. T2 ... 66.00
Fontana,Calif. K1 ... 85.00
Gary,Ind. U5 ... 66.00
Geneva,Utah C11 ... 66.00
Houston,Tex. S5 ... 74.00
Johnstown,Pa. B2 ... 66.00
Lackawanna,N.Y. B2 ... 66.00
LosAngeles B3 ... 85.00
Munhall,Pa. U5 ... 66.00
Seattle B3 ... 85.00
So.Chicago R2,U5,W14 ... 66.00
So.Duquesne,Pa. U5 ... 66.00
So.SanFrancisco B3 ... 85.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ... $70.00
Buffalo R2 ... 70.00
Canton,O. R2 ... 70.00
Canton,O.(29) T7 ... 66.00
Conshohocken,Pa. A3 ... 77.00
Detroit R7 ... 73.00
Fontana,Calif. K1 ... 89.00
Gary,Ind. U5 ... 70.00
Houston,Tex. S5 ... 78.00
Ind.Harbor,Ind. Y1 ... 70.00
Johnstown,Pa. B2 ... 70.00
Lackawanna,N.Y. B2 ... 70.00
LosAngeles B3 ... 90.00
Massillon,O. R2 ... 70.00
Midland,Pa. C18 ... 70.00
Munhall,Pa. U5 ... 70.00
So.Chicago R2,U5,W14 ... 70.00
So.Duquesne,Pa. U5 ... 70.00
Struthers,O. Y1 ... 70.00
Warren,O. C17 ... 70.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ... $82.00
Cleveland R2 ... 82.00
Fontana,Calif. K1 ... 103.00
Gary,Ind. U5 ... 82.00
Massillon,O. R2 ... 82.00
So.Chicago,Ill. R2 ... 82.00
So.Duquesne,Pa. U5 ... 82.00

SHEET BARS (NT)
Fontana,Calif. K1 ... $89.00

SKELP
Aliquippa,Pa. J5 ... $3.45
Munhall,Pa. U5 ... 3.35
Warren,O. R2 ... 3.35
Youngstown R2, U5 ... 3.35

WIRE RODS
Alton,Ill. L1 ... 4.40
AlabamaCity,Ala. R2 ... 4.10
Buffalo W12 ... 4.10
Cleveland A7 ... 4.10
Donora,Pa. A7 ... 4.10
Fairfield,Ala. T2 ... 4.10
Fontana,Calif. K1 ... 4.90
Houston,Tex. S5 ... 4.50
Johnstown,Pa. B2 ... 4.10
Joliet,Ill. A7 ... 4.10
LosAngeles B3 ... 4.90
Minnequa,Colo. C10 ... 4.35
Monessen,Pa. P7 ... 4.30
No.Tonawanda,N.Y. B11 ... 4.10
Pittsburg,Calif. C11 ... 4.75
Portsmouth,O. P12 ... 4.30
Roebling,N.J. R5 ... 4.20
So.Chicago,Ill. R2 ... 4.10
SparrowsPoint,Md. B2 ... 4.20
Sterling,Ill.(1) N15 ... 4.10
Struthers,O. Y1 ... 4.10
Torrance,Calif. C11 ... 4.90
Worcester,Mass. A7 ... 4.40

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 ... 4.45
Lackawanna,N.Y. B2 ... 4.45
Munnall,Pa. U5 ... 4.45
So.Chicago,Ill. U5 ... 4.45

STRUCTURALS
Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 ... 3.60
Aliquippa,Pa. J5 ... 3.65
Bessemer,Ala. T2 ... 3.65
Bethlehem,Pa. B2 ... 3.65
Clairton,Pa. U5 ... 3.65
Fairfield,Ala. T2 ... 3.65
Fontana,Calif. K1 ... 4.25
Gary,Ind. U5 ... 3.65
Geneva,Utah C11 ... 3.65
Houston,Tex. S5 ... 4.05
Ind.Harbor,Ind. I-2 ... 3.65
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.25
Lackawanna,N.Y. B2 ... 3.70
Los Angeles B3 ... 4.25
Minnequa,Colo. C10 ... 4.10
Munhall,Pa. U5 ... 3.65
Niles,Calif.(22) P1 ... 4.85
Phoenixville,Pa. P4 ... 5.90
Portland,Oreg. O4 ... 4.50
Seattle B3 ... 4.30
So.Chicago,Ill. U5, W14 ... 3.65
So.SanFrancisco B3 ... 4.20
Torrance,Calif. C11 ... 4.25
Weirton,W.Va. W6 ... 3.90

Alloy Stand. Shapes
Clairton,Pa. U5 ... 4.35
Fontana,Calif. K1 ... 5.55
Munhall,Pa. U5 ... 4.35
So.Chicago,Ill. U5 ... 4.35

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ... 5.50
Bessemer,Ala. T2 ... 5.50
Bethlehem,Pa.(14) B2 ... 5.50
Clairton,Pa. U5 ... 5.50
Fairfield,Ala. T2 ... 5.50
Fontana,Calif. K1 ... 6.10
Gary,Ind. U5 ... 5.50
Geneva,Utah C11 ... 5.50
Ind.Harbor,Ind. I-2 ... 5.50
Ind.Harbor,Ind. Y-1 ... 6.00
Johnstown,Pa. B2 ... 5.50
Lackawanna,N.Y.(14) B2 ... 5.50
LosAngeles B3 ... 6.05
Munhall,Pa. U5 ... 5.50
Seattle B3 ... 6.10
So.Chicago,Ill. U5 ... 5.50
So.SanFrancisco B3 ... 6.00
Struthers,O. Y1 ... 6.00

Wide Flange
Bethlehem,Pa. B2 ... 3.70
Clairton,Pa. U5 ... 3.65
Fontana,Calif. K1 ... 4.65
Lackawanna,N.Y. B2 ... 3.70
Munhall,Pa. U5 ... 3.65
So.Chicago, Ill. U5 ... 3.65

H.S., L.A. Wide Flange
Aliquippa,Pa. J5 ... 5.50
Lackawanna,N.Y. B2 ... 5.50
Munhall,Pa. U5 ... 5.45
So.Chicago,Ill. U5 ... 5.45

BEARING PILES
Munhall,Pa. U5 ... 3.65
So.Chicago,Ill. U5 ... 3.65

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.65
Bessemer,Ala. T2 ... 5.65
Clairton,Pa. U5 ... 5.65
Cleveland J5, R2 ... 5.65
Conshohocken,Pa. A3 ... 5.90
Fairfield,Ala. T2 ... 5.65
Fontana,Calif.(30) K1 ... 6.25
Gary,Ind. U5 ... 5.65
Geneva,Utah C11 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.65
Ind.Harbor,Ind. Y-1 ... 6.15
Johnstown,Pa. B2 ... 5.65
Munhall,Pa. U5 ... 5.65
Pittsburgh,Pa. J5 ... 5.65
Seattle B3 ... 6.55
Sharon,Pa. S3 ... 5.70
So.Chicago,Ill. U5 ... 5.65
SparrowsPoint,Md. B2 ... 5.65
Warren,O. R2 ... 5.65
Youngstown Y1 ... 6.15

PLATES, Open-Hearth Alloy
Claymont,Del. C22 ... 4.85
Coatesville,Pa. L7 ... 5.25
Conshohocken,Pa. A3 ... 5.05
Fontana,Calif. K1 ... 5.40
Gary,Ind. U5 ... 4.75
Johnstown,Pa. B2 ... 4.75
Munhall,Pa. U5 ... 4.75
Sharon,Pa. S3 ... 4.75
So.Chicago,Ill. U5 ... 4.75
SparrowsPoint,Md. B2 ... 4.75

FLOOR PLATES
Cleveland J5 ... 4.75
Conshohocken,Pa. A3 ... 4.75
Ind.Harbor,Ind. I-2 ... 4.75
Munhall,Pa. U5 ... 4.75
So.Chicago,Ill. U5 ... 4.75

PLATES, Ingot Iron
Ashland,Ky.(15), A10 ... 3.95
Ashland,Ky.(15) A10 ... 4.45
Cleveland,o.l. R2 ... 4.30
Warren,O.o.l. R2 ... 4.30

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Ashland,Ky.(15) A10 ... 3.70
Bessemer,Ala. T2 ... 3.70
Clairton,Pa. U5 ... 3.70
Claymont,Del. C22 ... 4.15
Cleveland J5, R2 ... 3.70
Coatesville,Pa. E7 ... 4.15
Conshohocken,Pa. A3 ... 4.15
Fairfield,Ala. T2 ... 3.70
Fontana,Calif.(30) K1 ... 4.30
Gary,Ind. U5 ... 3.70
GraniteCity,Ill. G4 ... 4.40
Geneva,Utah C11 ... 3.70
Harrisburg,Pa. C5 ... 4.30
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2, Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Minnequa,Colo. C10 ... 4.50
Munhall,Pa. U5 ... 3.70
Pittsburgh J5 ... 3.70
Seattle B3 ... 4.60
Sharon,Pa. S3 ... 3.95
So.Chicago,Ill. U5, W14 ... 3.70
SparrowsPoint,Md. B2 ... 3.70
Steubenville,O. W10 ... 3.70
Warren,O. R2 ... 3.70
Weirton,W.Va. W6 ... 4.00
Youngstown R2, U5, Y1 ... 3.70

PLATES, Carbon A.R.
Fontana,Calif. K1 ... 5.45
Geneva,Utah C11 ... 4.85

PLATES, Wrought Iron
Economy,Pa. B14 ... 8.60

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 ... 3.70
Aliquippa,Pa. J5 ... 3.70
Alton,Ill. L1 ... 4.15
Atlanta,Ga. A11 ... 4.25
Bessemer,Ala. T2 ... 3.70
Buffalo R2 ... 3.70
Canton,O. R2 ... 3.70
Clairton,Pa. U5 ... 3.70
Cleveland R2 ... 3.70
Detroit R7 ... 3.85
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Houston,Tex. S5 ... 4.10
Ind.Harbor,Ind. I-2 Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.15
Niles,Calif. P1 ... 5.05
N.Tonawanda,N.Y. B11 ... 3.70
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.65
Seattle B3, N14 ... 4.45
Struthers,O. Y1 ... 3.70
Torrance,Calif. C11 ... 4.40
Weirton,W.Va. W6 ... 3.85
So.Chicago R2, U5, W14 ... 3.70
So.Duquesne,Pa. U5 ... 3.70
So.SanFran.Cal. B3 ... 4.45
Youngstown R2, U5 ... 3.70

BAR SIZE ANGLES, S. Shapes
Aliquippa,Pa. J5 ... 3.70
Atlanta,Ga. A11 ... 4.25
Johnstown,Pa. B2 ... 3.70
Lackawanna,N.Y. B2 ... 3.70
Niles,Calif. P1 ... 5.05
Portland,Oreg. O4 ... 4.65
SanFrancisco S7 ... 4.85

BAR SIZE ANGLES; H.R. CARBON
Bethlehem,Pa. B2 ... 3.90

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ... 4.30
Buffalo R2 ... 4.30
Canton,O. R2 ... 4.30
Canton,O.(29) T7 ... 3.95
Clairton,Pa. U5 ... 4.30
Detroit R7 ... 4.45
Ecorse,Mich. G5 ... 4.65
Fontana,Calif. K1 ... 5.35
Gary,Ind. U5 ... 4.30
Houston,Tex. S5 ... 4.70
Ind.Harbor,Ind. I-2 Y1 ... 4.30
Johnstown,Pa. B2 ... 4.30
KansasCity,Mo. S5 ... 4.90
Lackawanna,N.Y. B2 ... 4.30
LosAngeles B3 ... 5.35
Massillon,O. R2 ... 4.30
Midland,Pa. C18 ... 4.30
So.Chicago R2, U5, W14 ... 4.30
So.Duquesne,Pa. U5 ... 4.30
Struthers,O. Y1 ... 4.30
Warren,O. C17 ... 4.30
Youngstown U5 ... 4.30

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ... 4.55
Gary,Ind. U5 ... 4.55
Youngstown U5 ... 4.55

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ... 5.55
Bessemer,Ala. T2 ... 5.55
Bethlehem,Pa. B2 ... 5.55
Clairton,Pa. U5 ... 5.55
Cleveland R2 ... 5.55
Fairfield,Ala. T2 ... 5.55
Fontana,Calif. K1 ... 6.60
Gary,Ind. U5 ... 5.55
Ind.Harbor,Ind. I-2 ... 5.55
IndianaHarbor,Ind. Y1 ... 6.05
Johnstown,Pa. B2 ... 5.55
Lackawanna,N.Y. B2 ... 5.55
LosAngeles B3 ... 6.25
Pittsburgh J5 ... 5.55
Seattle B3 ... 6.30
So.Duquesne,Pa. U5 ... 5.55
So.SanFrancisco B3 ... 6.30
Struthers,O. Y1 ... 6.05
Youngstown U5 ... 5.55

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ... 4.55
BeaverFalls,Pa. M12,R2 ... 4.55
Buffalo, B5 ... 4.60
Camden,N.J. P13 ... 5.00
Carnegie,Pa. C12 ... 4.55
Chicago W18 ... 4.55
Cleveland A7, C20 ... 4.55
Detroit P17 ... 4.70
Donora,Pa. A7 ... 4.55
Elyria,O. W8 ... 4.55
FranklinPark,Ill. N5 ... 4.55
Gary,Ind. R2 ... 4.55
GreenBay,Wis. F7 ... 4.55
Hammond,Ind. L2, M13 ... 4.55
Hartford,Conn. R2 ... 5.10
Harvey,Ill. B5 ... 4.55
LosAngeles R2 ... 6.00
Mansfield,Mass. B5 ... 5.10
Massillon,O. R2, R8 ... 4.55
Monaca,Pa. S7 ... 4.70
Newark,N.J. W18 ... 5.00
Plymouth,Mich. P5 ... 4.80
Pittsburgh J5 ... 4.55
Putnam,Conn. W18 ... 5.10
Readville,Mass. C14 ... 5.10
St.Louis,Mo. M5 ... 4.95
So.Chicago,Ill. W14 ... 4.55
SpringCity,Pa. (5) K3 ... 5.00
Struthers,O. Y1 ... 4.55
Waukegan,Ill. A7 ... 4.55
Youngstown F3, Y1 ... 4.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ... 5.40
BeaverFalls,Pa. M12 ... 5.40
Bethlehem,Pa. B2 ... 5.40
Buffalo B5 ... 5.40
Camden,N.J. P13 ... 5.80
Canton,O. R2 ... 5.40
Canton,O.(29) T7 ... 4.90
Carnegie,Pa. C12 ... 5.40
Chicago W18 ... 5.40
Cleveland A7 ... 5.40
Cleveland C20 ... 5.40
Detroit P17 ... 5.45
Donora,Pa. A7 ... 5.45
Elyria,O. W8 ... 5.40
Gary,Ind. R2 ... 5.40
Hammond,Ind. L2 M13 ... 5.40
Hartford,Conn. R2 ... 5.85
Harvey,Ill. B5 ... 5.40
Lackawanna,N.Y. B2 ... 5.40
Mansfield,Mass. B5 ... 5.85
Massillon,O. R2, R8 ... 5.40
Midland,Pa. C18 ... 5.40
Monaca,Pa. S17 ... 5.40
Newark,N.J. W18 ... 5.75
Plymouth,Mich. P5 ... 5.60
So.Chicago,Ill. R2, W14 ... 5.40
Struthers,O. Y1 ... 5.40
Warren,O. C17 ... 5.40
Waukegan,Ill. A7 ... 5.45
Worcester,Mass. A7 ... 5.75
Youngstown F3, Y1 ... 5.40

RAIL STEEL BARS
ChicagoHts.(4) C2 ... 4.75
ChicagoHts.(3,4) I-2 ... 4.75
Franklin,Pa. (3,4) P5 ... 4.75
FortWorth,Tex.(26) T4 ... 4.85
Huntingtn,W.Va.(3) W7 ... 5.50
Marion,O.(3) P11 ... 4.75
Modinell.(3) R2 ... 4.75
Tonawanda(3,4) B12 ... 4.75
Williamsport(3) S19 ... 5.00
Williamsport(4) S19 ... 5.10

BARS, Wrought Iron
Dover,N.J.(Staybolt) U1 ... 15.00
Dover,(Eng.Bolt) U1 ... 13.50
Dover,(Wrgh.Iron) U1 ... 12.25
Economy,Pa.(S.R.) B14 ... 9.60
Economy,Pa.(D.R.) B14 ... 11.90
Economy,(Staybolt) B14 ... 12.20
McK.Rks.(Staybolt) L5 ... 14.50
McK.Rks.(S.R.) L5 ... 9.60
McK.Rks.(D.R.) L5 ... 13.00

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ... 3.70
Atlanta A11 ... 4.25
Buffalo R2 ... 3.70
Cleveland R2 ... 3.70
Emeryville,Calif. J7 ... 4.45
Fairfield,Ala. T2 ... 3.70
Fontana,Calif. K1 ... 4.40
Gary,Ind. U5 ... 3.70
Ind.Harbor,Ind. I-2 Y1 ... 3.70
Johnstown,Pa. B2 ... 3.70
KansasCity,Mo. S5 ... 4.30
Lackawanna,N.Y. B2 ... 3.70
LosAngeles B3 ... 4.40
Milton,Pa. B6 ... 4.55
Minnequa,Colo. C10 ... 4.15
Niles,Calif. P1 ... 5.05
Pittsburg,Calif. C11 ... 4.40
Pittsburgh J5 ... 3.70
Portland,Oreg. O4 ... 4.65
Seattle B3 ... 4.60
So.Chicago,Ill. U5 ... 3.60
SparrowsPoint,Md. B2 ... 3.60
Steubenville,O. W10 ... 3.60
Torrance,Calif. C11 ... 4.30
Warren,O. R2 ... 3.60
Weirton,W.Va. W6 ... 3.60
West Leechburg,Pa. A4 ... 3.75
Youngstown U5, Y1 ... 3.60

SHEETS, H.R. (19 gage)
AlabamaCity,Ala. R2 ... 4.75
Ashland,Ky. E6 ... 5.65
Ind.Harbor,Ind. I-2 ... 5.40
Mansfield,O. E6 ... 5.65
Niles,O. N12 ... 5.75
Torrance,Calif. C11 ... 5.40

SHEETS, H.R. (14) ga., heavier; High-Strength Low-Alloy
Cleveland J5, R2 ... 5.40
Conshohocken,Pa. A3 ... 5.65
Ecorse,Mich. G5 ... 5.95
Fairfield,Ala. T2 ... 5.40
Fontana,Calif. K1 ... 6.35
Gary,Ind. U5 ... 5.40
Ind.Harbor,Ind. I-2 ... 5.40
Ind.Harbor,Ind. Y1 ... 5.90
Irvin,Pa. U5 ... 5.40
Lackawanna(35) B2 ... 5.40
Pittsburgh J5 ... 5.40
Sharon,Pa. S3 ... 5.40
So.Chicago,Ill. U5 ... 5.40
SparrowsPoint(36) B2 ... 5.40
Warren,O. R2 ... 5.40
Weirton,W.Va. W6 ... 5.75
Youngstown U5 ... 5.40
Youngstown Y1 ... 5.90

SHEETS, Cold-Rolled; High-Strength Low-Alloy
Cleveland J5, R2 ... 6.65
Ecorse,Mich. G5 ... 7.10
Fontana,Calif. K1 ... 7.50
Gary,Ind. U5 ... 6.55
IndianaHarbor,Ind. Y1 ... 7.05
IndianaHarbor,Ind. I-2 ... 6.55
Irvin,Pa. U5 ... 6.55
Lackawanna(37) B2 ... 6.55
Pittsburgh J5 ... 6.55
SparrowsPoint(38) B2 ... 6.55
Warren,O. R2 ... 6.55
Weirton,W.Va. W6 ... 6.90
Youngstown Y1 ... 7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.35
Cleveland J5, R2	4.35
Ecorse,Mich. G5	4.50
Fairfield,Ala. T2	4.35
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.35
GraniteCity,Ill. G4	5.00
Ind Harbor,Ind. I-2, Y1	4.35
Irvin,Pa. U5	4.35
Lackawanna,N.Y. B2	4.35
Middletown,O. A10	4.35
Pittsburg,Calif. C11	5.30
Pittsburgh J5	4.35
SparrowsPoint,Md. B2	4.35
Steubenville,O. W10	4.35
Warren,O. R2	4.35
Weirton,W.Va. W6	4.35
Youngstown Y1	4.35

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.80
Ashland,Ky.(8) A10	4.80
Canton,O. R2	4.80
Dover,O. R1	5.50
Fairfield,Ala. T2	4.80
Gary,Ind. U5	4.80
GraniteCity,Ill. G4	5.50
Ind Harbor,Ind. I-2	4.80
Irvin,Pa. U5	4.80
Kokomo,Ind.(13) C16	5.20
MartinsFerry,O. W10	4.80
Niles,O. N12	6.00
Pittsburg,Calif. C11	5.55
SparrowsPoint,Md. B2	4.80
Steubenville,O. W10	4.80
Torrance,Calif. C11	5.55
Weirton,W.Va. W6	4.80

SHEETS, Galvanized No. 10, High-Strength Low-Alloy

Irvin,Pa. U5	7.20
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	5.35
Irvin,Pa. U5	5.35
Kokomo,Ind.(13) C16	5.75
Niles,O. N12	6.55

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	5.05
Middletown,O. A10	5.05

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.65
Niles,O. R2 (28)	5.65
Weirton,W.Va. W6	5.50

SHEETS, Zinc Alloy

Ind Harbor,Ind. I-2	5.70

SHEETS, Drum Body

Pittsburg,Calif. C11	4.30
Torrance,Calif. C11	4.30

SHEETS, Wall Casing

Fontana,Calif. K1	5.10

BLUED Stock, 29 ga

Yorkville,O. W10	6.80
Follansbee,W.Va.(23)F4	6.85

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.15	$7.40	$7.80
Fairfield,Ala. T2	7.25	7.50	7.90
Gary,Ind. U5	7.15	7.40	7.80
GraniteCity,Ill. G4	7.35	7.60	8.00
Ind Harbor,Ind. I-2, Y1	7.15	7.40	7.80
Irvin,Pa. U5	7.15	7.40	7.80
Niles,O. R2	7.15	7.40	7.80
Pittsburg,Calif. C11	7.90	8.15	8.55
SparrowsPoint,Md. B2	7.25	7.50	7.90
Weirton,W.Va. W6	7.15	7.40	7.80
Yorkville,O. W10	7.15	7.40	7.80

SHEETS, SILICON, H.R. or C.R (22 Ga.) COILS (Cut Lengths 1/16 lower)

	Field	Armature	Electric	Motor	Dynamo
BeechBottom W10 (cut lengths)			7.25	8.50	9.30
Brackenridge,Pa. A4			7.75	9.00	9.80
GraniteCity,Ill. G4 (cut lengths)			7.95	9.20	
Ind.Harbor,Ind. I-2	6.95	7.25	(34)		
Mansfield,O. E6 (cut lengths)	7.10	7.25	7.75	9.00	9.80
Niles,O. N12 (cut lengths)		6.75	7.25		
Vandergrift,Pa. U5		7.25	7.75	9.00	9.80
Warren,O. R2	6.95	7.25	7.75	9.00	9.80
Zanesville,O. A10		7.25	7.75	9.00	9.80

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths 1/16 lower)

Transformer Grade	72	65	58	52
Beechbottom W10 (cut lengths)	9.85	10.40	11.10	11.90
Brackenridge,Pa. A4	10.35			
Vandergrift,Pa. U5	10.35	10.90	11.60	12.40
Warren,O. R2	10.35			
Zanesville,O. A10	10.35	10.90	11.60	12.40

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)			14.75	15.25
Vandergrift,Pa. U5	12.90	13.75	14.75	15.25

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.65
Cleveland R2	4.65
Gary,Ind. U5	4.65
GraniteCity,Ill. G4	5.35
Ind Harbor,Ind. I-2	4.65
Irvin,Pa. U5	4.65
Middletown,O. A10	4.65
Youngstown Y1	4.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$6.25
Fairfield,Ala. T2	6.35
Gary,Ind. U5	6.25
GraniteCity,Ill. G4	6.45
Ind Harbor,Ind. I-2, Y1	6.25
Irvin,Pa. U5	6.25
Niles,O. R2	6.25
Pittsburg,Calif. C11	7.00
SparrowsPoint,Md. B2	6.35
Warren,O. R2	6.25
Weirton,W.Va. W6	6.25
Yorkville,O. W10	6.25

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	5.85
Gary,Ind. U5	5.85
GraniteCity,Ill. G4	6.05
Ind Harbor,Ind. Y1	5.30
Irvin,Pa. U5	5.85
Yorkville,O. W10	6.15

SHEETS, Culvert No. 16

	Cu	Cu Fe
Ashland,Ky. A10	5.60	
Canton,O. R2	5.65	6.10
Fairfield,Ala. T2	5.60	5.85
Gary,Ind. U5	5.60	5.85
IndianaHarbor I-2	5.60	5.85
Irvin,Pa. U5	5.60	5.85
Kokomo,Ind. C16	6.25	
MartinsFy,O. W10	5.60	5.85
Pittsburg,Cal. C11	6.35	
SparrowsPt. B2	5.60	
Torrance,Cal. C11	6.35	

SHEETS, Culvert, No. 16 Pure Iron

Ashland,Ky. A10	5.85
Fairfield,Ala. T2	5.85

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland,Ky.(8) A10	3.85
Cleveland R2	4.20
Ind Harbor,Ind. I-2	3.85
Warren,O. R2	4.20

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.95
Middletown,O. A10	4.85
Warren,O. R2	4.95

SHEETS, Galvanized Ingot Iron No. 10 Flat

Ashland,Ky.(8) A10	5.05
Canton,O. R2	5.55

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	5.30
Middletown,O. A10	5.30

SHEETS, ALUMINIZED

Butler,Pa. A10	8.15

TINPLATE, American Coke (Base Box)

	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.45	$8.70
Fairfield,Ala. T2	8.55	8.80
Gary,Ind. U5	8.45	8.70
Ind.Har. I-2, Y1	8.45	8.70
Irvin,Pa. U5	8.45	8.70
Pitts.Cal. C11	9.20	9.45
Sp.Pa.,Md. B2	8.55	8.80
Warren,O. R2	8.45	8.70
Weirton,W.Va. W6	8.45	8.70
Yorkville,O. W10	8.45	8.70

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$7.60
Gary,Ind. U5	7.50
Irvin,Pa. U5	7.50
SparrowsPoint,Md. B2	7.60
Yorkville,O. W10	7.50

SHEETS, LT. Coated Ternes, 6 lb

Yorkville,O. W10	$8.40

SHEET, Mfg. Ternes, 8 lb (Commercial Quality)

Gary,Ind. U5	$9.50
Yorkville,O. W10	9.50

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10	5.20
Gary,Ind. U5	5.20
Mansfield,O. E6	6.05
Middletown,O. A10	5.20
Niles,O. N12	6.00
Weirton,W.Va. W6	5.20

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.60

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.50

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	5.30
Conshohocken,Pa. A3	5.55
Ecorse,Mich. G5	5.95
Fairfield,Ala. T2	5.30
Fontana,Calif. K1	6.20
Gary,Ind. U5	5.30
Ind.Harb.,Ind. I-2	5.30
Ind.Harbor,Ind. Y1	5.80
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	6.05
Seattle B3	6.30
Sharon,Pa. S3	5.40
So.SanFrancisco(25) B3	6.05
SparrowsPoint,Md. B2	4.95
Warren,O. R2	5.30
Weirton,W.Va. W6	5.75
Youngstown Y1	5.80
Youngstown U5	5.30

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland J5	6.70
Cleveland A7	6.55
Dover,O. C16	7.30
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.55
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.55
Weirton,W.Va. W6	6.20
Youngstown Y1	7.05

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.50
Alton,Ill. L1	3.95
Ashland,Ky.(8) A10	3.50
Atlanta A11	4.05
Bessemer,Ala. T2	3.50
Bridgeprt.Conn.(10) S15	4.00
Buffalo(27) R2	3.50
Butler,Pa. A10	3.50
Carnegie,Pa. S18	4.00
Conshohocken,Pa. A3	3.90
Detroit M1	4.40
Ecorse,Mich. G5	3.80
Fairfield,Ala. T2	3.50
Fontana,Calif. K1	4.75
Gary,Ind. U5	3.50
Houston,Tex. S5	3.90
Ind.Harbor,Ind. I-2, Y1	3.50
Johnstown,Pa.(25) B2	3.50
KansasCity,Mo.(9) S5	4.10
Lackawanna,N.Y.(32)B2	3.50
LosAngeles B3	4.25
Milton,Pa. B6	4.35
Minneapa.Colo. C10	4.55
NewBritain(10) S15	4.00
No.Tonawanda,N.Y. B11	3.50
Pittsburg,Calif. C11	4.25
Riverdale,Ill. A1	3.50
SanFrancisco S7	4.85
Seattle B3, N14	4.50
Sharon,Pa. S3	4.00
So.Chicago,Ill. W14	3.50
So.SanFrancisco B3	4.25
SparrowsPoint,Md. B2	3.50
Torrance,Calif. C11	4.25
Warren,O. R2	3.50
Weirton,W.Va. W6	3.60
WestLeechburg,Pa. A4	3.75
Youngstown U5, Y1	3.50

STRIP, Hot-Rolled Alloy

Bridgeprt.Conn.(10) S15	5.45
Carnegie,Pa. S18	5.55
Fontana,Calif. K1	6.70
Gary,Ind. U5	5.50
Houston,Tex. S5	5.90
KansasCity,Mo. S5	6.10

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Berea,O. C7	...	6.80	7.40	9.25	11.65
Bridgeport,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
Bristol,Conn. W1	...	...	7.70	9.65	...
Carnegie,Pa. S18	...	6.80	7.40	9.35	11.65
Cleveland A7	4.65	6.45	7.40	9.35	11.65
Dearborn,Mich. D3	5.60	7.05	7.65	...	...
Detroit D2	5.60	6.65	7.25	...	...
Dover,O. C16	5.50	6.80	7.40	9.35	11.65
FranklinPark,Ill. T6	5.00	6.60	7.55	9.50	11.80
Harrison,N.J. C18	...	...	7.70	9.65	11.95
Mattapan,Mass. T6	5.50	6.75	7.70	9.65	11.95
NewBritn.,Conn.(10) S15	5.35	6.80	7.40	9.35	11.65
NewCastle,Pa. B4	5.35	6.80	7.40	9.35	...
NewCastle,Pa. S5	5.50	6.80	7.40	9.35	11.65
NewHaven,Conn. D2	5.85	6.75	7.35	...	...
NewYork W3	...	...	7.10	7.70	9.65	11.95
Pawtucket,R.I. NS:					
Cleve.orPitts.Base	...	6.80	7.40	9.35	11.65
Worcester,Mass.,Base	5.85	7.10	7.70	9.65	11.95
Sharon,Pa. S3	5.35	6.80	7.40	9.35	11.65
Trenton,N.J. R5	...	7.10	7.70	9.65	11.95
Wallingford,Conn. W2	5.85	6.75	7.35	9.30	11.60
Weirton,W.Va. W6	5.35	6.80	7.40	9.35	11.65
Worcester,Mass. A7	4.95	6.75	7.70	9.65	11.95
Worcester,Mass. T6	5.50	6.75	7.70	9.65	11.95
Youngstown C8	...	6.80	7.40	9.35	11.65

Spring Steel (Tempered)

Trenton,N.J. R5	...	10.30	12.50	15.35
Harrison,N.J. C18	...	10.30	12.50	15.35
NewYork W3	...	10.30	12.50	15.35

Midland,Pa. C18 ..... 5.85
NewBritn,Conn.(10) S15 5.45
Sharon,Pa. S3 ..... 5.85
Youngstown U5 ..... 5.50

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	5.50
Berea,O. C7	6.60
Bridgeprt,Conn.(10) S15	5.35
Butler,Pa. A10	4.65
Cleveland A7, J5	4.65
Dearborn,Mich. D3	5.60
Detroit D2	5.60
Detroit M1	5.45
Dover,O.(40) G6	5.50
Ecorse,Mich. G5	4.85
Follansbee,W.Va. F4	5.35
Fontana,Calif. K1	6.30
FranklinPark,Ill.(40) T6	4.90
Ind.Harbor,Ind. I-2	4.90
Lackawanna,N.Y. B2	4.65
LosAngeles C1	6.40
Mattapan,Mass. T6	5.50
Middletown,O. A10	4.65
NewBritain(10) S15	5.35
NewCastle,Pa. B4	5.35
NewCastle,Pa.(40) E5	5.25
NewHaven,Conn. D2	5.85
NewHaven,Conn. A7	5.15
Pawtucket,R.I. R3	6.00
Pawtucket,R.I.(21) N8	5.85
Riverdale,Ill.(40) A1	4.90
Rome,N.Y. R6	5.10
Sharon,Pa. S3	5.35
SparrowsPoint,Md. B2	4.65
Trenton,N.J. R5	6.00
Wallingford,Conn. W2	5.85
Warren,O.(40) T5	5.25
Warren,O. R2	4.65
Weirton,W.Va. W6	4.65
Youngstown C8 (40)	5.25
Youngstown Y1	4.65

STRIP, Electro Galvanized

Dover,O. G6	5.50
Warren,O. T5	5.25
Weirton,W.Va. W6	4.65
Youngstown C8	5.25

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Clad metals Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Bourdi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B12 Buffalo Steel Co.
B14 A. M. Byers Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Corp.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliot, Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire

G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div. Borg-Warner Corp.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Josiyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10)S15	10.75
Carnegie,Pa. S18	10.60
Cleveland A7	10.00
Dover,O. G6	10.50
Fontana,Calif. K1	11.65
Harrison,N.J. C18	10.60
Midland,Pa. C18	10.60
NewBrito,Conn.(10)S15	10.75
Pawtucket,R.I.(11) N8	10.75
Pawtucket,R.I.(12) N8	11.05
Sharon,Pa. S3	10.60
Worcester,Mass. A7	10.30
Youngstown U5	10.60

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.75
Warren,O. R2	4.10

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	5.25

TIGHT COOPERAGE HOOP

Atlanta A11	4.05
Riverdale,Ill. A1	3.90
Sharon,Pa. S2	4.15
Youngstown U5	3.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.90
Monessen,Pa. P16	11.40
Roebling, N.J. R5	11.55

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
AlabamaCity R2	5.70	5.95
Aliquippa J5	5.70	6.15
Atlanta A11	5.95	6.40
Bartonville(2)K4	5.70	6.15
Buffalo W12	4.85	
Cleveland A7	5.70	6.15
Crawfordsville MS	5.95	6.40
Donora,Pa. A7	5.70	6.15
Duluth,Minn. A7	5.70	6.15
Fairfield T2	5.70	6.15
Houston,Tex. S5	6.10	6.55
Johnstown B2	5.70	6.15
Joliet,Ill. A7	5.70	6.15
KansasCy,Mo. S5	6.30	6.75
Kokomo C16	5.80	6.05
LosAngeles B3	6.65	
Minnequa C10	5.95	4.45
Monessen P7	5.95	6.40
Palmer W12	5.15	
Pitts.,Calif. C11	6.65	6.80
Prtsmth.(18)P12	6.10	6.60
Rankin A7	5.70	6.15
So.Chicago R2	5.70	5.95
So.S.Fran. C10	6.65	7.10
SparrowsPt. B2	5.80	6.25
Sterling,Ill.(1)N15	5.70	6.15
Struthers,O. Y1	5.70	6.15
Torrance,Cal. C11	6.65	
Worcester A7	6.00	6.45

ROPE WIRE

	(A)	(B)
Alton,Ill. L1	8.65	8.90
Bartonville,Ill. K4	8.55	8.80
Buffalo W12	8.55	8.80
Fostoria,O. S1	8.85	9.10
Johnstown,Pa. B2	8.55	8.80
Monessen,Pa. P16	8.55	8.80
Monessen,Pa. P7	8.80	9.05
Palmer,Mass.W12	8.85	9.10
Portsmouth,O. P12	8.55	8.80
Roebling,N.J. R5	8.85	9.10
SparrowsPt. B2	8.65	8.90
Struthers,O. Y1	8.55	8.80
Worcester J4, T6	8.85	9.10

(A) Plow and Mild Plow.
(B) Improved Plow.

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	4.85
Aliquippa,Pa. J5	4.85
Atlanta A11	5.10
Alton,Ill. L1	5.05
Bartonville,Ill.(1) K4	4.85
Buffalo W12	4.85
Chicago W13	5.10
Cleveland A7, C20	4.85
Crawfordsville,Ind. MS	5.10
Donora,Pa. A7	4.85
Duluth,Minn. A7	4.85
Fairfield,Ala. T2	4.85
Fostoria,O.(24) S1	5.35
Houston S5	5.25
Johnstown,Pa. B2	4.85
Joliet,Ill. A7	4.85
KansasCity,Mo. S5	5.45
Kokomo,Ind. C16	4.95
LosAngeles B3	5.80
Minnequa,Colo. C10	5.10
Monessen,Pa. P7	5.10
Newark, 6-8 ga. I-1	5.50
No.Tonawanda B11	4.85
Palmer,Mass. W12	5.15
Pittsburg,Calif. C11	5.80
Portsmouth,O. P12	5.25
Rankin,Pa. A7	4.85
So.Chicago,Ill. R2	4.85
So.SanFrancisco C10	5.80
SparrowsPoint,Md. B2	4.95
Sterling,Ill.(1) N15	4.85
Struthers,O. Y1	4.85
Torrance,Calif. C11	5.80
Waukegan,Ill. A7	4.85
Worcester,Mass. A7, T6	5.15

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	6.20
Buffalo W12	6.35
Cleveland A7	5.85
Crawfordsville,Ind. MS	6.20
Detroit D2	6.20
Dover,O. G6	6.20
Fostoria,O. S1	6.00
Kokomo,Ind. C16	5.70
FranklinPark,Ill. T6	6.20
Massillon,O. R8	5.85
Monessen,Pa. P16	5.85
Monessen,Pa. P7	6.10
NewHaven,Conn. D2	6.50
Pawtucket,R.I.(12) N8	6.85
Trenton,N.J. R5	6.15
Worcester,Mass. A7	6.15
Worcester,Mass. T6	6.50
Worcester,Mass. W12	6.65

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.50
Monessen,Pa. P16	8.50
Roebling,N.J. R5	8.80
SparrowsPoint,Md. B2	8.60
Johnstown,Pa. B2	8.50

WIRE (16 gage)	An'l'd Stone	Galv. Stone
Aliquippa J5	10.15	12.15
Bartonville(1)K4	10.25	11.95
Cleveland A7	10.25	12.15
Crawfrdsville MS	10.30	12.00
Fostoria,O. S1	10.40	13.00
Johnstown B2	10.25	12.15
Kokomo C16	10.25	11.95
Minnequa C10	10.40	12.40
Palmer,Mass.W12	10.25	12.15
Pitts.Cal. C11	10.60	12.50
Prtsmth.(18) P12	10.55	12.30
SparrowsPt. B2	10.35	12.25
Waukegan A7	10.25	12.15

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	6.25
Alton,Ill. L1	6.45
Bartonville,Ill.(1) K4	6.25
Buffalo W12	6.25
Cleveland A7	6.25
Donora,Pa. A7	6.25
Duluth,Minn. A7	6.25
Fostoria,O. S1	6.25
Johnstown,Pa. B2	6.25
LosAngeles B3	7.20
Milbury,Mass.(12) N6	8.05
Monessen,Pa. P7, P16	6.25
Palmer,Mass. W12	6.55
Pittsburg,Calif. C11	7.20
Roebling,N.J. R5	6.55
Portsmouth,O. P12	6.25
So.Chicago,Ill. R2	6.25
So.SanFrancisco C10	7.20
SparrowsPoint,Md. B2	6.35
Struthers,O. Y1	6.25
Trenton,N.J. A7	6.55
Waukegan,Ill. A7	6.25
Worcester,Mass. A7	6.55
Worcester,Mass. J4	6.75

WIRE, Fine & Weaving (8" Coils)

Bartonville,Ill.(1) K4	8.90
Buffalo W12	8.90
Chicago W13	8.90
Cleveland A7	8.90
Crawfordsville,Ind. MS	8.95
Fostoria,O. S1	8.90
Johnstown,Pa. B2	8.90
Kokomo,Ind. C16	8.90
Monessen,Pa. P16	8.90
Palmer,Mass. W12	9.20
Portsmouth,O. P12	8.90
Roebling,N.J. R5	9.20
Waukegan,Ill. A7	8.90
Worcester,Mass. A7, T6	9.20

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	137
Aliquippa,Pa. J5	141
Atlanta A11	144
Bartonville,Ill.(19) K4	144
Crawfordsville,Ind. MS	146
Donora,Pa. A7	141
Duluth,Minn. A7	141
Fairfield,Ala. T2	141
Houston,Tex. S5	149
Johnstown,Pa. B2	141
Joliet,Ill. A7	141
KansasCity,Mo. S5	153
Kokomo,Ind. C16	143
Minnequa,Colo. C10	147
Monessen,Pa. P7	146
Pittsburg,Calif. C11	161
Portsmouth,O.(18) P12	148
Rankin,Pa. A7	141
So.Chicago,Ill. R2	137
So.SanFran.,Calif. C10	161
SparrowsPoint,Md. B2	143
Sterling,Ill.(1) N15	141

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	123
Atlanta A11	126
Bartonville,Ill.(19) K4	123
Crawfordsville,Ind. MS	132
Donora,Pa. A7	123
Duluth,Minn. A7	123
Fairfield,Ala. T2	123
Joliet,Ill. A7	123
KansasCity,Mo. S5	135
Kokomo,Ind. C16	125
Minnequa,Colo. C10	128
Pittsburg,Calif. C11	147
So.Chicago,Ill. R2	123
So.SanFran.,Calif. C10	147
SparrowsPoint,Md. B2	125
Sterling,Ill.(1) N15	123

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.90
Alton,Ill. L1	6.10
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth,Minn. A7	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Monessen,Pa. P7, P16	5.90
NewHaven,Conn. A7	6.20
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
So.SanFrancisco C10	6.85
SparrowsPoint,Md. B2	6.00
Torrance,Calif. C11	6.85
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Worcester,Mass. A7	6.20

WOVEN FENCE, 9-15½Ga.

	Col.
AlabamaCity,Ala. R2	127
Ala.City,Ala. 12-14ga.R2	214
Aliquippa,Pa.9-14½ga.J5	131
Atlanta A11	134
Bartonville,Ill.(19) K4	131
Crawfordsville,Ind. MS	133
Donora,Pa. A7	131
Duluth,Minn. A7	131
Fairfield,Ala. T2	131
Houston,Tex. S5	139
Johnstown,Pa. B2	131
Johnstown,17ga.,6" B2	205
Johnstown,17ga.,4" B2	208
Joliet,Ill. A7	131
KansasCity,Mo. S5	143
Kokomo,Ind. C16	133
Minnequa,Colo. C10	139
Monessen,Pa. P7	136
Pittsburg,Calif. C11	154
Portsmouth,O.(18) P12	138
Rankin,Pa. A7	131
So.Chicago,Ill. R2	127
Sterling,Ill.(1) N15	131

FENCE POSTS

ChicagoHts.,Ill. C2	140
Duluth,Minn. A7	125
Franklin,Pa. F5	140
Huntington,W.Va. W7	140
Johnstown,Pa. B2	140
Marion,O. P11	140
Minnequa,Colo. C10	130
Moline,Ill. R2	136
So.Chicago,Ill. R2	140
Tonawanda,N.Y. B12	140
Williamsport,Pa. S19	150

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.85
Lebanon,Pa.(3) B2	9.85
Minnequa,Colo. C10	9.85
Pittsburgh O3, P14	9.85
Seattle B3	10.35

NAILS & STAPLES, Stock To dealers & mfrs. (7)

	Col.
AlabamaCity,Ala. R2	118
Aliquippa,Pa.(13) J5	118
Atlanta A11	121
Bartonville,Ill.(19) K4	118
Chicago,Ill. W13	118
Cleveland A9	125
Crawfordsville,Ind. MS	122
Donora,Pa. A7	118
Duluth,Minn. A7	118
Fairfield,Ala. T2	118
Galveston,Tex. D7	128
Houston,Tex. S5	126
Johnstown,Pa. B2	118
Joliet,Ill. A7	118
Kansas City,Mo. S5	130
Kokomo,Ind. C16	120
Minnequa,Colo. C10	123
Monessen,Pa. P7	124
Pittsburg,Calif. C11	137
Portsmouth,O. P12	124
Rankin,Pa. A7	118
So.Chicago,Ill. R2	118
SparrowsPoint,Md. B2	120
Sterling,Ill.(1) N15	118
Torrance,Calif. C11	138
Worcester,Mass. A7	124

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$7.35
Wheeling,W.Va. 10	7.35

TIE PLATES

Fairfield,Ala. T2	4.50
Gary,Ind. U5	4.50
Ind.Harbor,Ind. I-2	4.50
Lackawanna,N.Y. B2	4.50
Minnequa,Colo. C10	4.50
Pittsburg,Calif. C11	4.65
Seattle B3	4.65
Steelton,Pa. B2	4.50
Torrance,Calif. C11	4.65

JOINT BARS

Bessemer,Pa. U5	4.70
Fairfield,Ala. T2	4.70
Ind.Harbor,Ind. I-2	4.70
Joliet,Ill. U5	4.70
Lackawanna,N.Y. B2	4.70
Minnequa,Colo. C10	4.70
Steelton,Pa. B2	4.70

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.40
Lebanon,Pa. B2	6.15
Minnequa,Colo. C10	6.15
Pittsburgh J5	6.15
Seattle B3	6.65
So.Chicago,Ill. R2	6.15
Struthers,O. Y1	6.15
Youngstown R2	6.15

AXLES

Ind.Harbor,Ind. S13	5.60
Johnstown,Pa. B2	5.60

RAILS	Std. No. 1	Std. No. 2	Std. Toe Rails All No. 2	60 lb Under
Bessemer,Pa. U5	3.60	3.50	3.55	4.00
Ensley,Ala. T2	3.60	3.50		4.00
Fairfield,Ala. T2	...	...	...	4.00
Gary,Ind. U5	3.60	3.50	3.55	...
Huntington,W.Va. W7	...	...	...	5.00
Ind.Harbor,Ind. I-2	3.60	3.50	3.55	...
Johnstown,Pa. B2	...	...	(16)4.00	
Lackawanna,N.Y. B2	3.60	3.50		4.00
Minnequa,Colo. C10	3.60	3.50		4.50
Steelton,Pa. B2	3.60	3.50		
Williamsport,Pa. S19	...	...		4.75

TOOL STEEL

Grade	$ per lb
Regular Carbon	0.230
Extra Carbon	0.270
Special Carbon	0.325
Oil Hardening	0.350
5% Cr Hot Work	0.350
Hi-Carbon-Cr	0.635

Grade by Analysis

W	Cr	V	Co	Mo	
18	4	1			1.505
18	4	2			1.650
20	25	4	25	1.6	12.25 3.535-3.675
19	4	2	7		2.460
18	25	4	25	1	4.75 2.125
18	4	2	9		2.445-2.45
13.5	4	3	...		1.6025

W	Cr	V	Mo	
6.4	4.5	1.9	5	0.96-0.965
6	4	3	6	1.190
1.5	4	1	8.5	0.810

Tool steel producers include: A4, A5, B2, B8, C4, C9, C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Footnotes:
(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) Philadelphia, del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cds. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.05c for 17 Ga. & heavier.
(14) Also wide flange beams.
(15) ¼" and thicker.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25c off for untreated.
(21) New Haven, Conn. base.
(22) Del. San Francisco Bay area.
(23) 28 Ga. 16" wide.
(24) Deduct 0.20c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, mill lengths, to fabricators; to consumers, 5.60c.
(27) Bar mill slag.
(28) Bonderized.
(29) Subject to 10% increase.
(30) Sheared; add 0.15c for universal mill.
(31) Not annealed.
(32) Rd. or square edge.
(33) To jobbers, deduct 20c
(34) 7.25c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 gage & lighter; 60" & narrower.
(38) 16 gage & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.

Key to Producers

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.

N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng-HighCarb. Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Div.
N14 Northwst. Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RellanceDiv.,EatonMfg.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.& I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel

T2 Tenn. Coal & Iron Div.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T8 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.

U1 Ulster Iron Works
U4 Universal Cyclops Steel
U5 United States Steel Co.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div. International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 YoungstownSheet&Tube

1.

Square sheared 13 gauge steel blanks are deep drawn into a rectangular base, 5-in. deep, on a 400 ton Clearing crankless press.

2.

Drawn bases feed down conveyor to trimming operation performed in Niagara A-5½ press.

3.

The bases advance on roller conveyor to a second Niagara A-5½ press where the center hole is cut.

4.

The final operation on a Niagara A-6½ press includes 10-hole piercing and return flanging — ready for shipping.

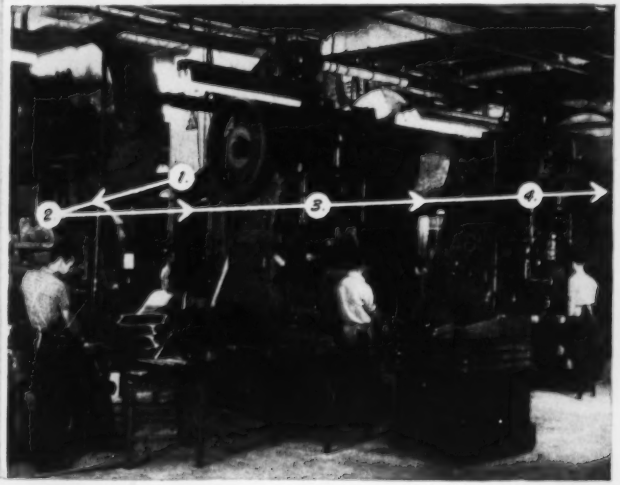
LEAKE *Created** Metal Stampings

*RESEARCH • DESIGN • ENGINEERING
PRODUCTION / DIE MAKING • COMPLETE PRESS ROOM • MACHINE SHOP
HEAT TREATING • ALL TYPES BRAZING AND WELDING
TESTING AND INSPECTION

are planned for FAST, ECONOMICAL production

In addition to creative engineering ability, an important factor is Leake plant equipment flexibility to make possible FAST, ECONOMICAL production. The forming of the gasoline pump base, pictured herewith, is typical of the many intriguing ways that Leake presses can be combined and put to use to provide quality production and quick delivery.

Approximately 70 percent of Leake customers use the combination of engineering services and outstanding production facilities to supplement their own stamping press departments. Such testimony emphasizes the importance of a *single, dependable, commercial* source where creative talents and well chosen plant equipment can serve advantageously. Press capacities range between *2500 tons*, mechanical and hydraulic, and smaller presses with speeds up to *300 strokes per minute*. Mechanical handling devices are used to advantage on jobs which warrant roll feeding and various types of conveyors.



Look to LEAKE *for unusual metal stampings!*

THE LEAKE STAMPING COMPANY • MONROE, MICHIGAN

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	34.0	32.0	...	+0.5	+2.5	...
¼	8.0	0.42	28.5	26.5	...	+3.5	+5.5	...
⅜	6.0	0.57	23.5	21.5	...	+10.0	+12.0	...
½	8.5	0.85	36.0	34.0	35.0	12.0	10.0	11.0
¾	11.5	1.18	39.0	37.0	38.0	16.0	14.0	15.0
1	17.0	1.68	41.5	39.5	40.5	19.5	17.5	18.5
1¼	23.0	2.28	42.0	40.0	41.0	20.5	18.5	19.5
1½	27.5	2.78	42.5	40.5	41.5	21.5	19.5	20.5
2	37	3.68	43.0	41.0	42.0	22.0	20.0	21.0
2½	58.5	5.82	43.5	41.5	42.5	23.0	21.0	22.0
3	76.5	7.62	43.5	41.5	42.5	23.0	21.0	22.0

Column A: Etna, Pa. N2 and 36½ % on 3½", 4"; Butler, Pa. ½-4", F6; Benwood, W. Va., 3½ points lower on ½", 1½ points lower on ¾", and 2 points lower on 4", W10; Sharon, Pa. M6, 1 point higher on ⅛", 2 points lower on ¼" and ⅜", Wheatland, Pa. W9, 2 points lower on ⅛", ¼", ⅜"; Following make ½" and larger; Lorain, O., N3; Youngstown R2 and 36½ % on 3½" and 4"; Youngstown Y1; Aliquippa, Pa. J5; Fontana, Calif. K1 quotes 11½ points lower on ½" and larger continuous weld and 24% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., Y1; Alton, Ill., (Gary base) 2 points lower discount L1.

Column D: Butler, Pa. F6, ⅛-⅜"; Benwood, W. Va. W10, except plus 4% on ⅛", plus 6% on ¼", plus 13% on ⅜" and 15.5% on 3½", 4"; Sharon, Pa. M6, plus 2.5 on ⅛", 1 point lower on ½", ¾", 1½ points lower on 1" and 1¼", 2 points lower on 1½", 2", 2½" and 3". Wheatland, Pa. W9, add 2 points on ⅛", ¼", ⅜", 1 point lower on ¾", 2 points lower on 1", 1¼", 2", 2½ points lower on 1½", 2½", 3". Etna, Pa. N2 and 15.5% on 3½", 4". Following quote only on ½" and larger: Lorain, O. N3; Youngstown R2, and 15½ % on 3½" and 4"; Youngstown Y1, Aliquippa, Pa. J5 quotes 1 point lower on ¾", 2 points lower on 1", 1½", 2", 1½ points lower on 1¼", 2½" and 3".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	29.5	8.0	29.5	8.0
2½	58.5	5.82	32.5	11.5	32.5	11.5
3	76.5	7.62	32.5	11.5	32.5	11.5
3½	92.0	9.20	34.5	13.5	34.5	13.5
4	$1.09	10.89	34.5	13.5	34.5	13.5
5	1.48	14.81	37.0	16.0	37.0	16.0
6	1.92	19.18	37.0	16.0	37.0	16.0

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5 quotes 1½ pts lower on 2", 1 pt lower on 2½-6 in.; Lorain N3; Youngstown Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft. mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	13.45	16.47	15.36	15.36
1¼	13	16.09	19.71	15.61	18.19
1½	13	17.27	21.15	17.25	20.30
1¾	13	19.29	23.62	19.62	23.09
2	13	21.62	26.48	21.99	25.86
2¼	13	24.35	29.82	24.50	28.84
2½	12	26.92	32.97	26.98	31.76
2¾	12	29.65	36.32	29.57	34.76
2¾	12	32.11	39.33	31.33	36.84
3	12	34.00	41.64	32.89	38.70

CLAD STEELS

(Cents per pound)

Cladding	Plates— Carbon Base 10%	Plates— Carbon Base 20%	Strip— Cold-Rolled Carbon Base Both 10%	Strip— Cold-Rolled Carbon Base Both Sides	Sheets— Carbon Base 10%	Sheets— Carbon Base 20%	Cu Base Both Sides
Stainless							
302	...	...	...	...	19.75	26.24–27.50	77.00
304	25.00	29.50	...	...	24.50	27.50–27.77	77.00
309	30.50	35.00	...	...	...	...	...
310	36.50	41.00	...	...	...	...	144.00
316	29.50	34.00	...	...	26.00	35.92–36.50	...
317	34.50	39.00	...	...	...	...	...
318	33.50	38.00	...	...	...	...	...
321	26.50	31.00	...	...	23.00	33.00	111.00
347	27.50	32.00	...	...	24.00	33.50–33.83	130.00
405	21.25	27.75	...	...	...	...	...
410	20.75	27.25	...	...	...	...	...
Nickel	33.55	45.15	41.00	54.00	...	...	...
Inconel	41.23	54.18	...	...	...	...	165.00
Monel	34.93	46.28	...	...	...	...	...
Copper*	...	...	23.70†	29.65†	...	...	...

* Deoxidized. † 20.20c for hot-rolled. ‡ 26.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheet, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:	
½-in. & smaller diam.	15
⅝-in. & ⅞-in.	18.5
1-in. and larger	17.5
Longer than 6 in.	
All diams.	14
Lag bolts, all diams.:	
6 in. and shorter	23
over 6 in. long	21
Ribbed Necked Carriage	18.5
Blank	34
Plow	34
Step, Elevator, Tap and Sleigh Shoe	21
Tire bolts	12
Boiler & Fitting-Up Bolts	31

NUTS

H.P. & C.P. Square:	Reg. Hvy.
½-in. & smaller	15 15
⅝-in. & ⅞-in.	12 6.5
1-in.-1½-in.	9 1
1⅛-in. & larger	7.5 1
H.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ⅞-in.	16.5 6.5
1-in.-1½-in.	12 2
1⅛-in. & larger	8.5 2
C.P. Hex.:	
½-in. & smaller	26 22
⅝-in. & ⅞-in.	23 17.5
1-in. & 1½-in.	19.5 12
1⅛-in. & larger	12 6.5

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

	Reg.	Hvy.
½-in. & smaller	35	28.5
⅝-in. & ⅞-in.	29.5	22
1-in.-1½-in.	24	15
1⅛-in. & larger	13	8.5
		Light
⅛-in. & smaller		33
¼-in. to ⅞-in.		28.5
1-in. to 1½-in.		26

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish	48 & 10
Plated finishes	31 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
⅝-in. & smaller	42
¾-in. through 1 in.	34
Longer than 6 in.:	
⅝-in. & smaller	26
¾-in. through 1 in.	4

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter	38
1 in. and smaller diam. x over 6 in.	26

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	35
¼-in. diam. & larger	16
N.F. thread, all diams.	10

RIVETS

F.o.b. midwestern plants

Structural ½-in., larger 7.85c

½-in. under ..... 36 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers.... List to list-plus-$1.

FLUORSPAR

Metallurgical grade, f. o. b. shipping point, in Ill.-Ky., net tons, carloads, effective

CaF2 content, 70% ..... $43; 80% $40

Imported, net ton duty paid, metallurgical grade, $33-$35.

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Diam.—Inches	Length	Cents per lb
17.18.20	60.72	17.85
8 to 16	48.60.72	17.85
7	48.60	19.57
6	48.60	20.95

CARBON

35.40	110	8.03
30	65.84.110	8.03
24	72 to 104	8.03
17 to 20	34.90	8.03

STAINLESS STEEL

Type	Sheets	C.R. Strip	Bars Wire Structurals
301	41.00	34.00	31.25
302	41.25	36.75	31.50
303	43.25	40.25	34.00
304	43.25	38.75	33.00
309	56.00	55.00	44.75
316	57.00	59.00	49.25
321	49.25	48.25	37.00
347	53.75	52.25	41.50
410	36.50	30.50	25.75
416	37.00	37.00	26.25
420	44.00	47.00	31.25
430	39.00	31.00	26.25
501	27.50	26.00	14.25
502	28.50	27.00	15.25

Bait., Types 301-347 sheet, except 303 and 309 E2.

Brackenridge, Pa., Sheets A4 quotes slight variations on Types 301-347.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502, A10.

Carnegie, Pa., sheets and strip except Types 303, 416, 501 & 502 S18.

Cleveland, strip A7.

Detroit, strip M1 quotes 34.00c on Type 301, 36.50c, 302; 38.50c, 304; 58.50c, 316; 52.00c, 347; 39.50c, 410; 31.00c, 430.

Dunkirk, N. Y., bars, wire A4 quotes slight variations on Types 301-347.

Duquesne, Pa., bars U5.

Fort Wayne, Ind., bars and wire, except Types 501 & 502 J6 quotes slight variations on Types 301-347.

Gary, Ind., sheets except Type 416 U5.

Harrison, N. J., strip and wire C18.

Massillon, O., all items, R2.

McKeesport, Pa., strip, Type 410; bars & wire, Types 410 through 430 and 31.25c on Type 302, 33.75c on 303, 32.75c on 304, 48.75c on 316, 36.75c on 321, 41.25c on 347 F2.

McKeesport, Pa., bars, sheets except Type 416 U5.

Middletown, O., sheets and strip except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars U5.

Pittsburgh, sheets C18.

Reading, Pa., strip except 34.25c on Type 301 and 56.00c on 309; bars, except 31.50c on Type 301 and 43.25c on 309 C4.

Sharon, Pa., strip, except Types 303, 309, 416, 501, 502 and 34.25c on Type 301 S3.

So. Chicago, Ill., bars & structurals U5.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip W2 quotes 0.25c higher.

Washington, Pa., bars, sheets & strip except 0.25c higher on Type 301 J3.

Washington, Pa., Types 301 through 347 sheets & strip except 303, 309, 316 sheets 62.00c, strip 64.00c W4.

Watervliet, N. Y., structurals & bars A4 quotes variations on Types 301-347.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4 quotes slight variations on Types 301-347.

Youngstown, strip except Types 303, 309, 316, 416, 501 and 502 and 34.25c on Type 301 C8.

COAL CHEMICALS

Spot, cents per gallon, ovens

Pure benzol 30.00-35.00

Toluol, one deg. .. 26.00-33.00

Industrial xylol .. 25.00-33.50

Per ton bulk, ovens

Sulphate of ammonia $32-$45

Cents per pound, ovens

Phenol 40 (carlots, non-returnable drums) .. 17.25

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

Sponge iron	Cents
98+% Fe, carlots	17.00
Swedish, c.i.f. New York, in bags	8.85-9.95
Electrolytic iron:	
Annealed, 99.5% Fe	42.50
Unannealed, 99+% Fe	36.50
Unannealed, 99+% Fe (minus 325 mesh)	53.50
Powder Flakes	48.50
Carbonyl Iron: 97.9-99.8%, size 5 to 10 microns	83.00-148.00
Aluminum:	
Carlots, freight allowed	29.50
Atomized, 500 lb drums, freight allowed	32.50
Antimony	75.85
Brass, 20-ton lots	30.00-33.25
Bronze, 10-ton lots	51.25-60.00
Phosphor-Copper, 20-ton lots	50.00
Copper:	
Electrolytic	37.25
Reduced	33.75
Lead	26.30
Magnesium	75.00-85.00
Manganese:	
Minus 100-mesh	57.00
Minus 35 mesh	52.00
Minus 200 mesh	62.00
Nickel unannealed	86.00
Nickel-Silver 5-ton lots	45.00
Silicon	38.50
Solder (plus cost of metal)	8.50
Stainless Steel, 302	83.00
Zinc, 10-ton lots	25.00-32.50
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	6.00
Less than 1000 lb	6.15
98.8% minus 65 mesh:	
1000 lb and over	4.15
Less than 1000 lb	4.25
Molybdenum: 99.9%, minus 200 mesh	3.24
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvill fur. $14.50-15.00

Connellsvill fdy. 17.00-18.00

New River foundry 21.30

Wise county, foundry 15.95

Wise county, furnace 15.20

OVEN FOUNDRY COKE

Kearny, N. J. ovens $22.75

Everett, Mass., Ovens New England, del. *24.80

Chicago ovens 23.00

Chicago, del. 24.50

Terre Haute, ovens ... 22.50

Milwaukee, ovens 23.75

Indianapolis, ovens ... 22.75

Chicago, del. 24.42

Cincinnati, del. 25.85

Detroit, del. 26.85

Ironton, O., ovens ... 22.50

Cincinnati, del. 25.12

Painesville, O., ovens . 24.00

Cleveland, del. 25.82

Erie, Pa., ovens 23.50

Birmingham, ovens ... 20.30

Birmingham, del. 21.60

Philadelphia, ovens .. 22.70

Nevillelsland, Pa., ovens 23.00

Swedeland, Pa., ovens 22.60

St. Louis, ovens St. Louis, del. 25.40

Portsmouth, O., ovens 22.50

Cincinnati, del. 25.12

Detroit, ovens 24.00

Detroit, del. 25.00

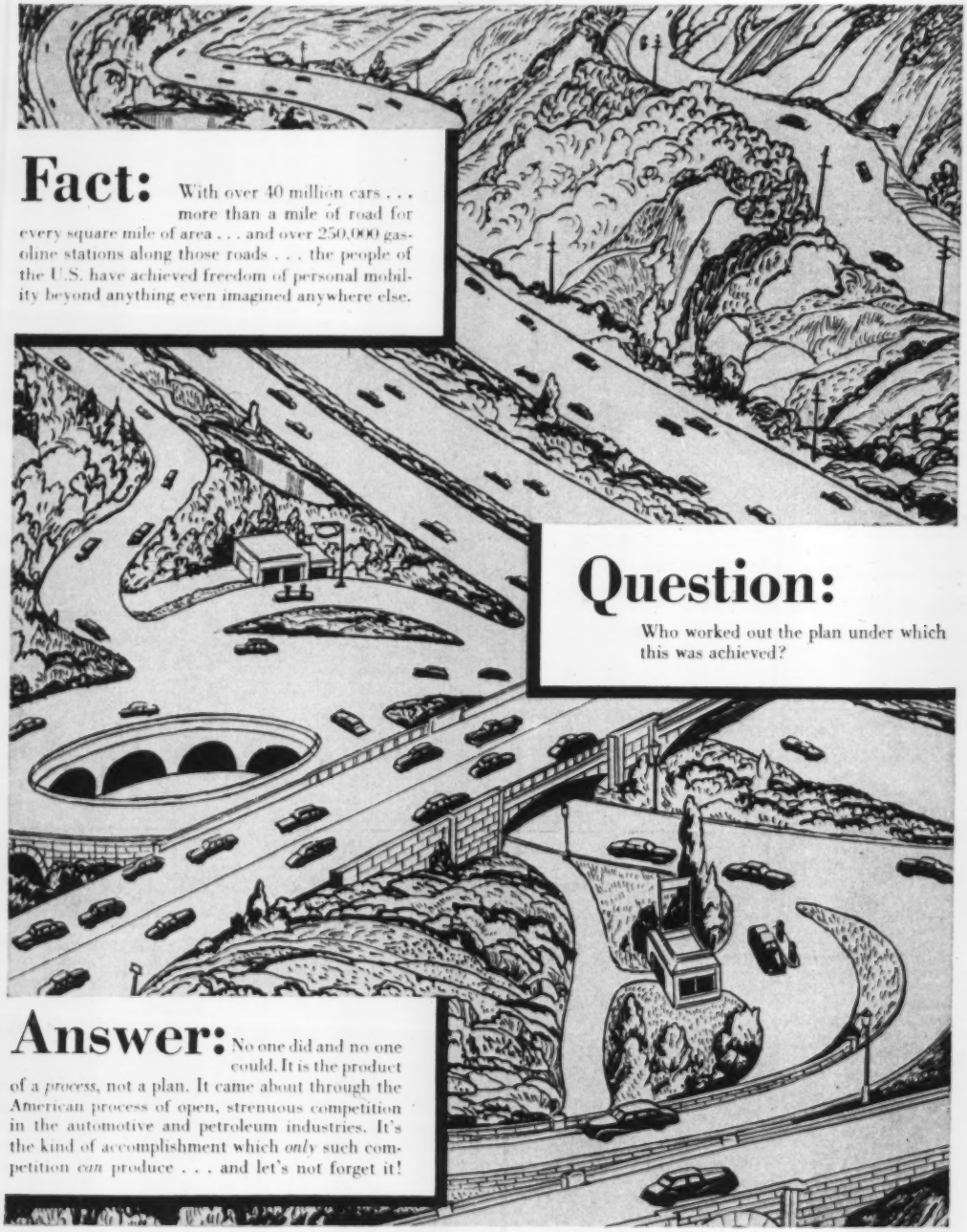
Buffalo, del. 26.89

Flint, del. 26.59

Pontiac, del. 25.47

Saginaw, del. 26.92

* Or within $4.15 freight zone from works.



Fact: With over 40 million cars . . . more than a mile of road for every square mile of area . . . and over 250,000 gasoline stations along those roads . . . the people of the U.S. have achieved freedom of personal mobility beyond anything even imagined anywhere else.

Question:

Who worked out the plan under which this was achieved?

Answer: No one did and no one could. It is the product of a *process*, not a plan. It came about through the American process of open, strenuous competition in the automotive and petroleum industries. It's the kind of accomplishment which *only* such competition *can* produce . . . and let's not forget it!

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The competitive system delivers the most to the greatest number of people

WAREHOUSE STEEL PRODUCTS

(Representative prices, cents per pound, for delivery within switching limits, subject to extras.)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga. & Heavier*	C.R.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140‡§		Carbon	Floor
New York (city)	6.40	7.11	8.55	7.05	...	6.49	7.29	9.28	6.37	6.74	7.98
JerseyCity(c'try)	6.10	6.91	8.25	6.75	...	6.19	6.99	8.98	6.07	6.44	7.68
Boston (city)	6.40	7.18	8.83	6.35	...	6.25	7.04	9.00	6.40	6.83	7.84
Boston (c'try)	6.20	6.98	8.63	6.15	...	6.05	6.84	9.20	6.20	6.63	7.64
Phila. (city)	6.04	6.97	8.35	6.33	7.11	6.27	7.16	8.97	6.09	6.30	7.29
Phila. (c'try)	5.79	6.72	8.10	6.08	6.86	6.02	6.91	8.72	5.84	6.05	7.04
Balt. (city)	5.74	7.00	8.40	6.23	...	6.21	6.83	...	6.33	6.33	7.37
Balt. (c'try)	5.54	6.80	8.20	6.03	...	6.01	6.63	...	6.13	6.13	7.37
Norfolk, Va.	6.78	...	...	...	...	6.04	7.30	...	6.30	6.30	7.15
Richmond, Va.	5.74	6.57	8.38	6.14	...	5.91	6.59	...	6.72	6.86	8.00
Wash. (w'hse)	6.05	7.26	8.49	6.50	...	6.50	7.26	...	6.60	6.65	7.86
Buffalo (del.)	5.74	6.52	8.29	6.06	...	5.72	6.65	10.65††	6.00	6.23	7.56
Buffalo (w'hse)	5.54	6.32	8.09	5.86	...	5.52	6.45	10.45††	5.80	6.03	7.35
Pitts. (w'hse)	5.50	6.32	7.85	5.59	6.90	5.45	6.20	10.30††	5.65	5.65	6.89
Detroit (w'hse)	5.75	6.47	8.12	5.76	7.15	5.76	6.64	9.13	6.09	5.88	7.21
Cleveland (del.)	5.74	6.52	8.16	5.85	7.18	5.76	6.60	8.91	6.15	6.02	7.40
Cleve. (w'hse)	5.54	6.32	7.96	5.65	6.98	5.56	6.40	8.71	5.95	5.82	7.20
Cincin. (w'hse)	5.84	6.38	8.29	5.77	...	5.75	6.64	...	6.09	6.14	7.28
Chicago (city)	5.74	6.52	8.05	5.69	...	5.67	6.50	10.30††	5.85	5.90	7.09
Chicago (w'hse)	5.54	6.32	7.85	5.49	...	5.47	6.30	10.10††	5.65	5.70	6.89
Milwau. (city)	5.90	...	8.21	5.85	...	5.83	6.88	10.46††	6.01	6.06	7.25
Milwau. (c'try)	5.70	...	8.01	5.65	...	5.63	6.68	10.26††	5.81	5.86	7.05
St. Louis (del.)	6.02	6.80	8.33	6.56	...	5.95	6.88	10.58	6.22	6.27	7.46
St. L. (w'hse)	5.82	6.60	8.13	6.36	...	5.75	6.68	10.38	6.02	6.07	7.26
Kans. City(city)	6.40	7.20	8.40	6.35	...	6.35	7.20	...	6.50	6.60	7.80
Kans.City(w'hse)	6.20	7.00	8.20	6.15	...	6.15	7.00	...	6.30	6.40	7.60
Birm'hm (city)	5.75	6.55	6.90‡	5.70	...	5.70	7.53	...	5.85	6.10	8.25
Birm'hm(w'hse)	5.60	6.40	6.75‡	5.55	...	5.55	7.53	...	5.70	5.95	8.23
Los Ang. (city)	6.50	8.30‡	9.45	6.60	10.65	6.45	8.35	...	6.50	6.50	8.75
L. A. (w'hse)	6.30	8.10‡	9.25	6.40	10.45	6.25	8.15	...	6.30	6.30	8.55
Seattle-Tacoma	7.02	8.64	9.60	7.54	...	6.70	9.19	10.35	6.54	6.90	8.73
San Francisco	6.62	7.88‡	9.10‡	6.43	...	6.45	8.20	11.15	6.32	6.37	8.50

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; ** 16 gauge; †† as annealed; §§ 15 gage. Base quantities, 2000 to 9999 lb except as noted. Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; ‡—500 to 1499 lb; ²—450 to 1499 lb; ³—3500 lb and over; ⁴—1000 to 1999 lb.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural), lower lake ports.

After adjustment for analysis, prices will be increased or decreased as the case may be for increases of decreases after Dec. 2, 1950, in applicable lake vessel rates, upper lake rail, freights, dock handling charges and taxes thereon.

Old range bessemer	$8.70
Old range nonbessemer	8.55
Mesabi bessemer	8.45
Mesabi nonbessemer	8.30
High phosphorus	8.30

Eastern Local Ore

Cents per unit del. E. Pa.

Foundry and basic 56-62% concentrates contract	17.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	nom.
Long-term contract	$20.00-24.00
North African hematites (spot)	26.00-28.00
Brazilian iron ore, 68-69% (spot)	30.00-31.00

Tungsten Ore

Net ton unit, duty paid

Foreign wolframite and scheelite, per net ton unit	$65.00
Domestic scheelite mines	65.00

Manganese Ore

Manganese, 48% nearby, $1.18-$1.22 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; shipments against old contracts for 48% ore are being received from some sources at 85c-87c.

Chrome Ore

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$39.00-42.00
48% 3:1	44.00-45.00
48% no ratio	30.00-32.00

South African Transvaal

44% no ratio	$27.00-28.00
48% no ratio	34.00-35.00

Brazilian

44% 2.5:1 lump	nom

Rhodesian

45% no ratio	$29.00
48% no ratio	31.50-32.00
48% 3:1 lump	50.00-51.00

Domestic—rail nearest seller

48% 3:1	$39.00

Molybdenum

Sulphide concentrates per lb. molybdenum content, mines	$1.00

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton, $75, Palmerton, Pa.; $75, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $185 per gross ton of alloy, c.l. packed, $197; gross ton lots, packed, $212; less gross ton lots, packed, $229; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Ashtabula, O. Base price: $187, Johnstown, Pa.; $185, Sheridan, Pa.; $188, Etna, Pa. $190, Chattanooga, Tenn.; $186, Anaconda, Mont.

Shipment from Pacific Coast warehouses by one seller, add $33 to above prices f.o.b. Los Angeles, Oakland, Portland, Oreg. Shipment from Chicago warehouse, ton lots $227; less gross ton lots, $244, f.o.b. Chicago. Add or subtract $2.30 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 25.75c per lb of contained Mn, carload packed 26.5c, ton lots 27.6c, less ton 28.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% min., C 0.07% max., 2" x D 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max.). Carload, lump, bulk 19.15c per lb of contained Mn, carload packed 19.9c, ton lot 21.0c, less ton 22.2c. Delivered. Spot, add 0.25c.

Manganese metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload, lump, bulk, 34c per lb of metal; packed, 34.75c; ton lots 36.25c; less ton lots 38.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: 40,000 lb or more, 28c; 2000 to 39,999 lb, 30c; 250 to 1999 lb, 32c. Premium for hydrogen-removed metal, 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si 9.90c per lb of alloy, carload packed, 10.65c, ton lots 11.55c, less ton 12.55c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.). Ton lots $1.33, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%.) Contract, $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max., C 0.4% max.): Contract, ton lot, 2" x D, $4.90 per lb of contained Cb, less ton $4.95. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30% max.) ton lots, 2" x D, $3.75 per lb of contained Cb plus Ta, deld.; less ton lots $3.80.

Silrax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c; less ton 19.5c, Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18c per lb of alloy; ton lots 19c; less ton lots 20.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 15c per lb of alloy; ton lots 16.50c; less ton lots 17.75c, f.o.b., Niagara Falls; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 14.50c, packed 15.50c; ton lots, packed, 15.75c; less ton lots, packed, 16.25c per lb of alloy, delivered to destination within United States.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth, $1.32; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic Oxide: Per lb, contained Mo, f.o.b. Langeloth $1.14, packed in bags containing 2c lb of molybdenum; Washington, Pa., $1.13.

NOTE: Current prices on chromium, silicon, vanadium, boron and tungsten alloys appeared on page 141, Feb. 25 issue; calcium, zirconium and briquetted alloys, page 167, Mar. 3. Refractories prices also were published on page 167, Mar. 3 issue.

CEILING PRICES, IRON AND STEEL SCRAP

Prices as set forth in Office of Price Stabilization ceiling price regulation No. 5, as amended Feb. 5, 1952

STEELMAKING SCRAP COMPOSITE

Mar. 6	$43.00
Feb. 28	43.00
Feb. 1952	43.00
Mar. 1951	44.00
Mar. 1947	37.25

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

Basing point ceiling prices per gross ton from which maximum shipping prices are computed on scrap of dealer and industrial origin; and from which ceiling on-line and ceiling delivered prices are computed on scrap of railroad origin.

Basing Point	Grade 1 No. 1 Bundles Dealer, Industrial	No. 1 Heavy Melt Railroad
Alabama City, Ala.	$39.00	$41.00
Ashland, Ky.	42.00	44.00
Atlanta, Ga.	39.00	45.00
Bethlehem, Pa.	42.00	44.00
Birmingham, Ala.	39.00	41.00
Brackenridge, Pa.	44.00	46.00
Buffalo, N. Y.	43.00	45.00
Butler, Pa.	44.00	46.00
Canton, O.	44.00	46.00
Chicago, Ill.	42.50	44.50
Cincinnati, O.	43.00	45.00
Claymont, Del.	42.50	44.50
Cleveland, O.	43.00	45.00
Coatesville, Pa.	42.50	44.50
Conshohocken, Pa.	42.50	44.50
Detroit, Mich.	41.00	43.00
Duluth, Minn.	40.00	42.00
Harrisburg, Pa.	42.50	44.50
Houston, Tex.	37.00	39.00
Johnstown, Pa.	44.00	46.00
Kansas City, Mo.	39.50	41.50
Kokomo, Ind.	42.00	44.00
Los Angeles	35.00	37.00
Middletown, O.	43.00	45.00
Midland, Pa.	44.00	46.00
Minnequa, Colo.	38.00	40.00
Monessen, Pa.	44.00	46.00
Phoenixville, Pa.	42.50	44.50
Pittsburg, Calif.	35.00	37.00
Pittsburgh, Pa.	44.00	46.00
Portland, Oreg.	35.00	37.00
Portsmouth, O.	42.00	44.00
St. Louis, Mo.	41.00	43.00
San Francisco	35.00	37.00
Seattle, Wash.	35.00	37.00
Sharon, Pa.	44.00	46.00
Sparrows Pt., Md.	42.00	44.00
Steubenville, O.	44.00	46.00
Warren, O.	44.00	46.00
Weirton, W. Va.	44.00	46.00
Youngstown, O.	44.00	46.00

Differentials from Base

Differentials per gross ton for other grades of dealer and industrial scrap:

O-H and Blast Furnace Grades

2. No. 1 Bushelling	Base
3. No. 1 Heavy Melting	$1.00
4. No. 2 Heavy Melting	1.00
5. No. 2 Bundles	1.00
6. Machine Shop Turnings	10.00
7. Mixed Borings and Short Turnings	6.00
8. Shoveling Turnings	6.00
9. No. 2 Bushelling	4.00
10. Cast Iron Borings	6.00

Elec. Furnace and Fdry. Grades

11. Billet, Bloom & Forge Crops	+ 7.50
12. Bar Crops & Plate	+ 5.00
13. Cast Steel	+ 5.00
14. Punchings & Plate Scrap	+ 2.50
15. Electric Furnace Bundles	+ 2.00
Cut Structurals & Plate	
16. 3 feet and under	+ 3.00
17. 2 feet and under	+ 5.00
18. 1 foot and under	+ 6.00
19. Briquetted Cast Iron Borings	Base
Foundry Steel	
20. 2 feet and under	Base
21. 1 foot and under	+ 2.00
22. Springs and Crankshafts	+ 1.00
23. Alloy Free Turnings	+ 3.00
24. Heavy Turnings	+ 1.00
25. Briquetted Turnings	Base
26. No. 1 Chemical Borings	+ 3.00
27. No. 2 Chemical Borings	+ 4.00
28. Wrought Iron	+ 10.00
29. Shafting	+ 10.00
31. Old Tin & Terne Plated Bundles	+ 10.00

Unprepared Grades

When compressed constitutes

32. No. 1 Bundles	+ 6.00
33. No. 2 Bundles	+ 9.00
34. Other than material suitable for hydraulic compression	+ 8.00

Restriction on Use

(1) Prices for Grades 11 and 23 may be charged only when shipped to a consumer directly from an industrial producer; otherwise ceiling prices shall not exceed prices established for Grades 12 and 8, respectively.

(2) Prices established for Grades 26 and 27 may be charged only when sold for use for chemical or annealing purposes, and in the case of Grade 27, for briquetting and direct charge into an electric furnace; otherwise ceiling prices shall not exceed price established for Grade 10.

(3) Prices established for Grade 28 may be charged only when sold to a producer of wrought iron; otherwise ceiling price shall not exceed ceiling price for corresponding grade of basic open-hearth.

(4) Premiums for Grades 11-18, 20 and 21 may be charged only when sold for use in electric and acid open-hearth furnaces or foundries; or in basic O-H or blast furnace under NPA allocation or OPS authorization.

(5) Prices for Grade 29 may be charged only when sold for forging or rerolling purpose.

Special Pricing Provisions

(1) Sellers of Grades 26 and 27 may make an extra charge of $1.50 per ton for loading in box cars, or 75 cents per ton for covering gondola cars with a weather-resistant covering.

(2) Ceiling price of pit scrap, ladle scrap, salamander scrap, skulls, skimmings or scrap recovered from slag dumps and prepared to charging box size, shall be computed by deducting from the price of No. 1 heavy melting steel of dealer and industrial origin, the following amounts. Where iron content is 85% and over, $6; 75% and over, $10; less than 75%, $12.

(3) Ceiling price of any inferior grade of scrap not listed shall not exceed the price of No. 1 bundles less $15.00.

Differentials from Base

Differentials per gross ton above or below the price of Grade 1 (No. 1 railroad heavy melting steel) for other grades of railroad steel scrap:

2. No. 2 Heavy Melting Steel	$2.00
3. No. 2 Steel Wheel	Base
4. Hollow Bored Axles and loco. axles with keyways between the wheelseats	Base
5. No. 1 Bushelling	+ 3.50
6. No. 1 Turnings	+ 3.00
7. No. 2 Turnings, Drillings & Borings	+ 12.00
8. No. 2 Cast Steel and uncut wheelcenters	+ 6.00
9. Uncut Frogs, Switches, Plates	Base
10. Filled Tubes & Pipes	+ 8.00
11. Structural, Wrought Iron and/or steel, uncut	+ 6.00
12. Destroyed Steel Cars	+ 8.00
13. No. 1 Sheet Scrap	+ 9.50
14. Scrap Rails, Random Lengths	+ 2.00
15. Rerolling Rails	+ 7.00
Cut Rails	
16. 3 feet and under	+ 5.00
17. 2 feet and under	+ 6.00
18. 18 inches and under	+ 8.00
19. Cast Steel, No. 1	+ 3.00
20. Uncut Ties	+ 2.00
21. Cut Ties	+ 5.00
Bolsters & Side Frames	
22. Uncut	Base
23. Cut	+ 3.00
24. Angles Splice Bars & Tie Plates	+ 5.00
25. Solid Steel Axles	+ 12.00
26. Steel Wheels, No. 3 oversize	Base
27. Steel Wheels, No. 3	+ 5.00
28. Spring Steel	+ 5.00
29. Couplers & Knuckles	+ 5.00
30. Wrought Iron	+ 8.00
31. Firebrxes	+ 8.00
32. Boilers	+ 6.00
33. No. 2 Sheet Scrap	+ 13.00
34. Carsides, Doors, Car Ends, cut apart	+ 6.00
35. Unassorted Iron & Steel	+ 6.00
36. Unprepared scrap, not suitable for hydraulic compression	+ 8.00

Restrictions on Use

(1) Price established for Grade 15 may be charged only when purchased and sold for rerolling uses; otherwise, ceiling shall not exceed that for Grade 14.

(2) Price established for Grade 30 may be charged only when sold to a producer of wrought iron; otherwise, ceiling shall not exceed that for No. 1 heavy melting steel.

(3) Price for Grade 25 may be charged only when sold for rerolling and forging purposes; otherwise ceiling shall not exceed that for base grade (No. 1).

CAST IRON SCRAP

Ceiling price per gross ton for following grades shall be f.o.b. shipping point:

Cast Iron:	
1. No. 1 (Cupola)	$49.00
2. No. 2 (Charging Box)	47.00
3. No. 3 (Hvy. Breakable)	45.00
4. No. 4 (Burnt Cast)	41.00
5. Cast Iron Brake Shoes	41.00
6. Stove Plate	46.00
7. Clean Auto Cast	52.00
8. Unstripped Motor Blocks	43.00
9. Wheels, No. 1	47.00
10. Malleable	55.00
11. Drop Broken Machinery	52.00

Restrictions on Use

(1) Ceiling shipping point price which a basic open-hearth consumer may pay for No. 1 cast iron, clean auto cast, malleable or drop broken machinery cast shall be ceiling price for No. 2 charging box cast.

(2) Ceiling shipping point price which any foundry other than a malleable iron producer may pay for Grade 10 shall be ceiling price for No. 1 cast iron.

Preparation Charges

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of dealer or industrial origin authorized by OPS are:

(1) For preparing into Grades No. 3, No. 4 or No. 2, $8.

(2) For hydraulically compressing Grade No. 1, $6 per ton; Grade No. 5, $8.

(3) For crushing Grade No. 6, $3. For preparing into:

(4) Grade No. 25, $6.

(5) Grade No. 19, $6.

(6) Grades No. 12, No. 13, No. 14, No. 16, or No. 20, $10.

(7) Grade No. 17 or No. 21, $11.

(8) Grade No. 18, $12.

(9) For hydraulically compressing Grade No. 15, $8.

(10) For preparing into Grade No. 28, $10.

Ceiling fees per gross ton which may be charged for intransit preparation of any grade of steel scrap of railroad origin shall be:

(1) For preparing into Grade No. 1 and Grade No. 2, $8.

(2) For hydraulically compressing Grade No. 13, $6.

For preparing into:

(3) Grade No. 16, $4.

(4) Grade No. 17, $5.

(5) Grade No. 18, $7.

(6) Grade No. 21, $4.

(7) Grade No. 23, $4.

Ceiling fees per gross ton which may be charged for intransit preparation of cast iron are limited to:

(1) For preparing Grade No. 8 into Grade No. 7, $9.

(2) For preparing Grade No. 3 into Grade No. 11, $7.

(3) For preparing Grade No. 3 into Grade No. 1, $4.

Whenever scrap has arrived at its point of delivery and consumer engages a dealer to prepare such scrap, no fee may be charged for such services unless consumer obtains prior written OPS approval.

Commissions

No commission shall be payable to a broker in excess of $1.

Premium for Alloy Content

No premium may be charged for alloy content except: $1.25 per ton for each 0.25% of nickel where scrap contains not less than 1% and not over 5.25% nickel; $2 per ton for scrap containing not less than 0.15 per cent molybdenum and $3 for scrap containing not less than 0.65% molybdenum; for scrap containing not less than 10% manganese, $4 for scrap in sizes larger than 12 x 24 x 8 in., and $14 for scrap cut in that size or smaller (applicable only if scrap is sold for electric furnace uses or on NPA allocation); $1 for scrap conforming to SAE 52100.

Switching Charges

Switching charges to be deducted from basing point prices of dealer, industrial and nonoperating railroad scrap, to determine ceiling shipping point prices for scrap originating in basing points are per gross ton:

Alabama City, Ala., 43c; Ashland, Ky., 47c; Atlanta, 51c; Bethlehem, Pa., 52c; Birmingham, 56c; Brackenridge, Pa. 53c; Buffalo, 53c; Butler, Pa., 65c; Canton, O., 51c; Chicago (including Gary, Ind.), $1.34; Cincinnati (including Newport, Ky.), 65c; Claymont, Del. (including Chester, Pa.), 79c; Cleveland, 76c; Coatesville, Pa., 50c; Conshohocken, Pa., 20c; Detroit, 95c; Duluth, Minn., 50c; Harrisburg, Pa., 51c; Houston, 57c; Johnstown, Pa., 75c; Kansas City, Mo., 78c; Kokomo, Ind., 51c; Middletown, O., 26c; Midland, Pa., 75c; Minnequa, Colo., 33c; Monessen, Pa., 51c; Phoenixville, Pa., 51c; Pittsburg, Calif., 65c; Pittsburgh (including Bessemer, Homestead, Duquesne, Munhall), 99c; Portland, Oreg., 52c; Portsmouth, O., 51c; St. Louis (including Federal, Granite City, E. St. Louis, Madison, Ill.), 51c; San Francisco (including So. San Francisco, Niles, Oakland), 66c; Seattle, 59c; Sharon, Pa., 75c; Sparrows Point, Md., 2c; Steubenville, O. 51c; Warren, Pa., 75c; Weirton, 70c; Youngstown, 75c.

HAMILTON, ONT.
(Delivered Prices)

Heavy Melt	$35.00
No. 1 Bundles	35.00
No. 2 Bundles	35.00
Mechanical Bundles	31.50
Mixed Steel Scrap	31.00
Mixed Borings, Turnings	32.00
Rails, Remelting	33.00
Rails, Rerolling	38.00
Bushelling	29.50
Bushelings new factory:	
Prep'd	33.00
Unprep'd	31.00
Short Steel Turnings	32.00
Cast Iron Grades*	
No. 1 Machinery Cast	55.00

*F.o.b. shipping point.

For power economy in press operation: A double-pressure pump, automatically lubricated, with totally-enclosed mechanism.

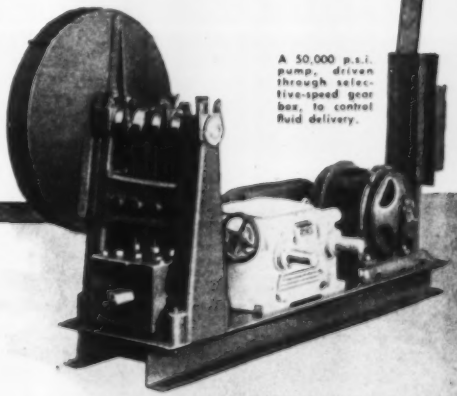
LOGEMANN HYDRAULIC PRESSURE PUMPS

Absolute Reliability... Maximum Delivery... Low Maintenance Cost... and Smooth Operation

Logemann Brothers offer a complete line of specially-designed High Pressure Pumps in a wide range of sizes featuring both single and double pressure types. Both vertical and horizontal styles are proving highly successful in press and accumulator operations and for hydrostatic test purposes.

Pressures range from approximately 2,000 p.s.i. to in excess of 50,000 p.s.i.

When making inquiries will you please include your pressure and gallonage requirements and indicate the type of application.



A 50,000 p.s.i. pump, driven through selective-speed gear box, to control fluid delivery.

LOGEMANN Also Specializes in
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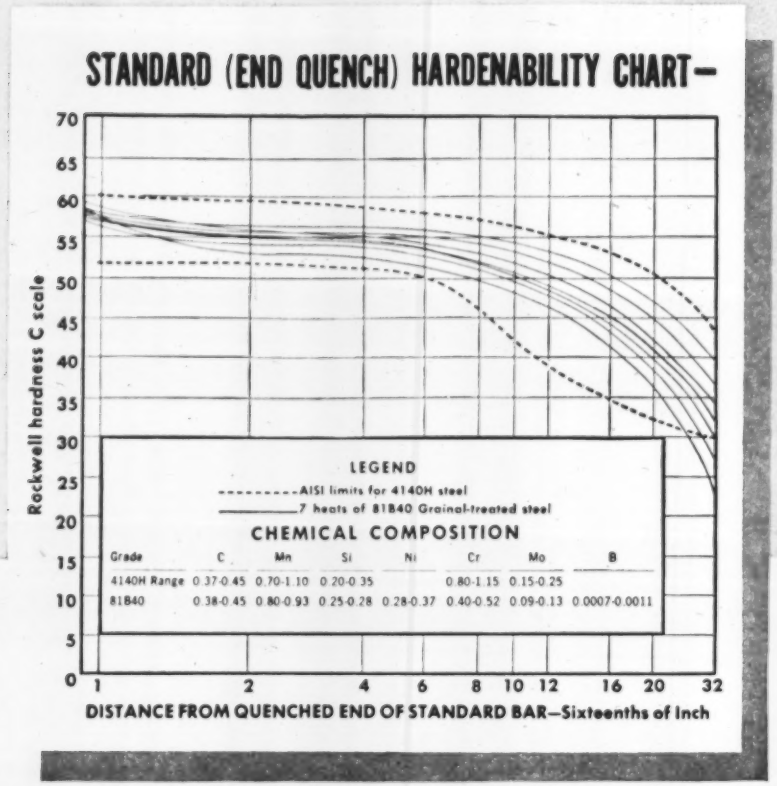


Consistent Hardenability obtained in Boron Steels made with GRAINAL ALLOYS

The most common test for boron steels is measurement of hardenability by the end quench or Jominy hardenability test. Today's steel substitutions are made on the basis of similar hardenability since a reasonable prediction can thus be made of the hardness and strength of a given part.

The curves above show the relationship between the hardenability of a series of seven heats of 81B40 steel and the hardenability band for 4140H steel, which it often replaces. The 81B40 heats were made in one electric furnace shop, and the remarkably consistent hardenability shown by the curves was obtained by the use of Grainal alloy as the means of adding the boron.

Consistent hardenability means consistent strength and hardness after heat treatment, which is the aim of every fabricator. The best proof that the Grainal alloys insure this objective is found in the successful use of three million tons of Grainal-treated steels.

VANADIUM CORPORATION OF AMERICA

420 LEXINGTON AVENUE, NEW YORK 17, N. Y. • DETROIT • CHICAGO • CLEVELAND • PITTSBURGH

MAKERS OF ALLOYS

VANCORAM

CHEMICALS AND METALS

The Metal Market

Civilian goods producers prepare to lift operations as National Production Authority promises larger allotments of copper and aluminum beginning in April

MANUFACTURERS of consumer durable goods, beginning next month, will be allotted larger tonnages of nonferrous metals than expected. For several months government officials forecast that the greatest pinch in supplies would be experienced in early 1952 and that a better balance would be achieved in subsequent months. This situation is now a reality.

Additional allocations in the second quarter will amount to about 50 million pounds of aluminum and 20 million to 25 million pounds of copper products.

The auto industry, hard hit by government restrictions on use of metals, will be one of the chief beneficiaries of the liberalized program. NPA officials are not prepared as yet to say how much an increase above the presently authorized 930,000 passenger vehicles monthly will be allowed in second quarter, but the industry would like to produce 1 million to 1.1 million units.

Needs Itemized—For an increase to the lower figure, the industry would need, after absorption of present inventories of materials: 1,022,309 pounds of copper from brass mills, 307,000 pounds of copper from copper wire mills, 163,864 pounds of copper from brass foundries, 161,795 pounds of aluminum, 22,500 tons of carbon steel, 2123 tons of alloy steel, and 93,000 pounds of stainless steel sheet. These are the quantities that would be required over and above existing CMP allotments for second quarter.

In general, the contemplated supplemental allotments for the April-June period would enable all aluminum and copper users to get a total of 30 per cent of their base period consumption of these metals.

The supplementary allotments can be made because of the return of some material from the military and because certain manufacturers are not placing orders for materials in quantities originally permitted, says Manly Fleischmann, defense production administrator.

NPA Lifts Lead Use Controls

You will benefit also from improved lead supply. National Production Authority removed all restrictions on use of lead in order M-38.

"The size of foreign lead offerings made to domestic purchasers in the last several weeks indicates that 1952 imports will far exceed the 1951 total," says Erwin Vogelsang, director, Tin, Lead & Zinc Division, NPA.

"Present indications are that domestic supplies of lead, at least during the next few months, will be adequate to meet not only defense requirements but also to fill all normal needs of the civilian economy," he says. "The amended order will enable consumers to rebuild stocks which were seriously depleted by the severe lead shortage."

Under the revised order, consumers are permitted to carry a 60-day lead inventory instead of a 30-day supply. With the removal of restrictions, consumers may use all the lead they need for their regular applications and may even employ it to relieve the strain on materials which are still scarce, says the Lead Industries Association.

In 1951 supplies here were reduced greatly by the diversion of lead to foreign buyers because they were willing and able to pay prices in excess of the ceiling prices to which domestic consumers must adhere. Imports in 1951 were only 267,000 tons, less than half the 550,000 tons imported in 1950. Now, however, the foreign market has receded to a point where large quantities of foreign lead are available for export to the United States.

Meanwhile, production from domestic mines is progressing at an accelerated pace. Scrap, the third important source of lead, also is providing a greater supply than a year ago.

As a result, total lead available here this year may reach 1.3 million tons, or about 150,000 tons more than a year ago. This quantity should take care of all requirements without difficulty.

New British Offer—The British Ministry of Supply for the second time in about a month is seeking to sell another large tonnage of refined lead to the United States for its stockpile. About 20,000 long tons are involved and the price is understood in the trade to be the 19-cent ceiling level. Early last month the British negotiated the sale of 30,000 long tons of lead to the United States government at the ceiling price.

STEEL'S Metal Price Averages for Feb., 1952

(Cents per pound)

Electrolytic Copper, del Conn.	24.500
Lead, St. Louis	18.800
Prime, Western Zinc, E. St. Louis	19.500
Straits Tin, New York	121.500
Primary Aluminum ingots, del.	19.000
Antimony, f.o.b. Laredo, Tex.	50.000
Nickel, f.o.b. refinery	56.500
Silver, New York	88.000

Aluminum Needs Surveyed

Is more aluminum needed for the future than is involved in the present expansion program? If so, how will we get it—by further expansion of domestic capacity, or by importation from Canada, or both? If it proves advisable to provide more aluminum for the future, what will this mean in terms of fabricating shop facilities to manufacture the metal into the ultimate end-products?

These are questions which the Defense Production Administration discussed last week with representatives of the aluminum and copper producing industries. The copper people participated because of the extent to which aluminum figures as a substitute for copper.

The meeting was called specifically to discuss the offer by the Aluminum Co. of Canada to undertake enlarged exports of aluminum to the United States over a period of years. The latter company, which proposes to do its own financing, has requested an underwriting commitment from the United States to the extent of 60 per cent of the amount of metal which it would agree to set aside for export to independent fabricators and other buyers in the United States for the years 1955-1959 inclusive.

The contract would provide that in the event the Aluminum Co. of Canada could not find commercial buyers for the expected exports in the amount of 300,000 net tons per year during these years the United States would, if requested, purchase an amount not to exceed 180,000 tons annually for stockpile purposes.

DPA officials point out that when the present domestic expansion program is completed in mid-1953, aluminum producing capacity will be 1,560,000 tons per year, or about double capacity prior to Korea. Total available supply in mid-1953, counting imports from Canada on the present arrangement, will be at the rate of about 2 million net tons annually.

U. S. Buys Nickel, Cobalt

Consumers of metals in this country are drawing heavily on Canadian resources to fill their expanding needs, especially of nickel, cobalt and copper.

Falconbridge Nickel Mines Ltd., Toronto, will ship 50 million pounds of nickel and 1.5 million pounds of cobalt to the United States government over the next nine years. Additional options in the contract with Defense Materials Procurement Agency provide for possible sale of 25 million pounds of copper and an additional 25 million pounds of nickel during the life of the agreement.

The company agreed that until the end of 1956 not less than 40 per cent of its entire production of nickel and cobalt will be offered to the American market. Our government will advance $6 million to Falconbridge for expansion of its production capacity.

Basic price to be paid for the nickel is 56.66c a pound, f.o.b. vessel, Kristiansand, which may be varied in line with future fluctuations in the open market price. Cobalt will be bought at $1.80 a pound, or the current quotation, whichever is higher. Sales of electrolytic copper in cathode form, if tendered, will be at 19.00c a pound.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 24.50c, Conn. Valley; Lake 24.62½c delivered.

Brass Ingots: 85-5-5-5 (No. 115) 27.25c; 88-10-2 (No. 215) 40.00c; 80-10-10 (No. 305) 33.00c; No. 1 yellow (No. 405) 23.25c.

Zinc: Prime western 19.50c; brass special 19.75c; intermediate 20.00c, East St. Louis; high grade 20.85c, delivered.

Lead: Common 18.80c; chemical 18.90c; corroding 18.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 19.00c, pigs 18.00c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 20.50c; No. 12 foundry alloy (No. 2 grade) 19.50c; steel deoxidizing grades, notch bars, granulated or shot, Grade 1, 18.80c; grade 2, 18.60c; grade 3, 18.40c; grade 4, 18.20c.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 24.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt 121.50c.

Antimony: American 99.89.8% and over but not meeting specifications below 50.00c; 99.8% and over (arsenic 0.05% max., other impurities 0.1% max.) 50.50c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 56.50c; 25-lb pigs, 59.15c; "XX" nickel shot 60.15c; "F" nickel shot or ingots, for addition to cast iron, 56.50c. Prices include import duty.

Mercury: Open market, spot, New York $200-$204 per 76-lb flask.

Beryllium Copper: 3.75-4.25% Be, $1.56 per lb of alloy, f.o.b. Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.55; del.; special or patented shapes $2.80.

Cobalt: 97.99% $2.40 per lb for 500 lb (kegs); $2.42 per lb for 100 lb (case); $2.47 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York 88.00c per oz.

Platinum: $90-$93 per ounce from refineries.

Palladium: $24 per troy ounce.

Iridium: $200 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Ceiling prices, cents per pound, f.o.b. mill, effective Aug. 23, 1951)

Sheet: Copper 41.68; yellow brass 38.28; commercial bronze 95% 41.68; 90% 41.13; red brass 85% 40.14; 80% 39.67; best quality 39.15; nickel silver, 18% 53.14; phosphor-bronze grade A, 5% 61.07.

Rod: Copper, hot-rolled 37.53, cold-drawn 38.78; yellow brass free cutting 32.63; commercial bronze 95% 41.30; 90% 40.82; red brass 85% 39.83; 80% 39.36.

Seamless Tubing: Copper 41.72; yellow brass 41.29; commercial bronze, 90% 43.79; red brass 85% 43.05.

Wire: Yellow brass 38.57; commercial bronze, 95% 41.90; 90% 41.42; red brass, 85% 40.43; 80% 39.96; best quality brass 39.44.

(Base prices, effective Dec. 26, 1951)

Copper Wire: Bare, soft, f.o.b. eastern mills 100,000 lb lots, 28.545; 30,000 lb lots, 28.67, l.c.l., 29.17. Weatherproof, 100,000 lb, 30.35; 30,000 lb, 30.80; l.c.l., 31.10. Magnet wire, del., 15,000 lb or more, 34.50; l.c.l., 35.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders)

Sheets and Circles: 2s and 3s mill finish c.l.

Thickness Range Inches	Widths or Diameters, Sheet In.	Inc.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48		30.1		
0.135-0.066	12-48		30.6		
0.065-0.077	12-48		31.2	29.1	33.2
0.076-0.061	12-48		31.8	29.3	33.4
0.060-0.048	12-48		32.1	29.5	33.7
0.047-0.038	12-48		32.5	29.8	34.0
0.037-0.030	12-48		32.9	30.2	34.6
0.029-0.024	12-48		33.4	30.5	35.0
0.023-0.019	12-36		34.0	31.1	35.7
0.018-0.017	12-36		34.7	31.7	36.6
0.016-0.015	12-36		35.5	32.4	37.6
0.014	12-24		36.5	33.3	38.9
0.013-0.012	12-24		37.4	34.0	39.7
0.011	12-24		38.4	35.0	41.2
0.010-0.0095	12-24		39.4	36.1	42.7
0.009-0.0085	12-24		40.6	37.2	44.4
0.008-0.0075	12-24		41.9	38.4	46.1
0.007	12-18		43.3	39.7	48.2
0.006	12-18		44.8	41.0	52.8

* Lengths 72 to 180 inches. † Maximum diameter, 26 inches.

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or distance across flats	Round R317-T4, 178-T4	R-317-T4	Hexagonal 178-T4
0.125	52.0	...	...
0.156-0.0188	44.0	...	...
0.219-0.313	41.5	...	...
0.375	40.0	46.0	48.0
0.406	40.0	...	...
0.438	40.0	46.0	48.0
0.469	40.0	...	...
0.500	40.0	46.0	48.0
0.531	40.0	...	...
0.563	40.0	...	45.0
0.594	40.0	...	...
0.625	40.0	43.5	45.0
0.688	40.0	...	45.0
0.750-1.000	39.0	41.0	42.5
1.063	39.0	...	41.0
1.125-1.500	37.5	39.5	41.0
1.563	37.0	...	...
1.625	36.5	...	39.5
1.688-2.000	36.5	...	...

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $24.00 per cwt; add 50c cwt 10 sq ft to 140 sq ft. Pipe: Full coils $24.00 per cwt. Traps and bends: List prices plus 65%.

ZINC

Sheets 26.50c, f.o.b. mill 36,000 lb and over. Ribbon zinc in coils, 25.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 25.50-26.50c; over 12-in., 25.50-26.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 77.00c. Strip, cold-rolled, 83.00c. Rods and shapes 73.00c. Plates, 73.00c. Seamless tubes, 106.00c.

MONEL

(Base prices f.o.b. mill)

Sheets, cold-rolled 60.50c. Strip, cold-rolled 63.50c. Rods and shapes, 58.50c. Plates, 59.50c. Seamless tubes, 93.50c. Shot and blocks, 53.50c.

MAGNESIUM

Extruded Rounds 12 in. long, 1.31 in. in diameter, less than 25 lb, 55.00-62.00c; 25 to 99 lb, 45.00-52.00c; 100 lb to 5000 lb, 41.00c.

TITANIUM

(Prices per lb 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $10; forgings, $6; hot-rolled and forged bars, $6.

DAILY PRICE RECORD

1952	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Mar. 1-6	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Feb. 1-29	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
Jan. Avg.	24.50	18.80	19.50	109.404	19.00	50.00	56.50	88.00
Feb. Avg.	24.50	18.80	19.50	121.50	19.00	50.00	56.50	88.00
1951								
Dec. Avg.	24.50	18.80	19.50	103.00	19.00	50.00	56.50	88.00
Nov. Avg.	24.50	18.80	19.50	103.00	19.00	44.56	56.50	88.00
Oct. Avg.	24.50	18.726	19.426	103.00	19.00	42.00	56.50	88.12
Sept. Avg.	24.50	18.80	17.50	103.00	19.00	42.00	56.50	90.16
Aug. Avg.	24.50	18.80	17.50	103.00	19.00	42.00	56.50	90.16
July Avg.	24.50	18.80	17.50	106.00	19.00	42.00	56.50	90.16
June Avg.	24.50	18.80	17.50	117.962	19.00	42.00	56.50	88.492

NOTE: Copper: Electrolytic del. Conn. Valley. Lead: common grade del. St. Louis; Zinc, prime western, E. St. Louis. Tin: Straits del. New York. Aluminum primary ingots, 99% del.; Antimony: bulk, f.o.b. Laredo, Tex. Nickel: electrolytic cathodes, 99.9% base sizes at refinery unpacked. Silver: open market, New York. Prices, cents per pound, except silver, cents per ounce.

Plating Materials

Chromic Acid: 99.9% flakes, f.o.b. Philadelphia, carloads, 28.00c; 5 tons and over 28.50c; 1 to 5 tons, 29.00c; less than 1 ton 29.50c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed: Flat, rolled, 38.34c; oval 37.84c.

Nickel Anodes: Rolled oval, carbonized, carloads, 74.50c; 10,000 to 30,000 lb, 75.50c; 3000 to 10,000 lb, 76.50c, 500 to 3000 lb 77.50c; 100 to 500 lb, 79.50c; under 100 lb, 82.50c; f.o.b. Cleveland.

Nickel Chloride: 36.50c in 100 lb bags; 34.50c in lots of 400 lb through 10,000 lb; 34.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on 400 lb or more.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 86.7c; 100 or 350 lb drums only, 100 to 600 lb 71.60c; 700 to 1900 lb 69c; 2000 to 9900 lb, 67.3c. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Tin Anodes: Bar, 1000 lb and over, $1.375; 500 to 999 lb, $1.38; 200 to 499 lb, $1.385; less than 200 lb, $1.40. Freight allowed east of Mississippi and north of Ohio and Potomac.

Zinc Cyanide: 100 lb drums, less than 10 drums 54.30c; 10 or more drums, 52.30c, f.o.b. Niagara Falls, N. Y.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb $1.11; more than 2000 lb, $1.09. Freight allowed east of Mississippi and north of Ohio and Potomac rivers.

Stannous Chloride (Anhydrous): In 400 lb bbl, 98.5c; 100 lb kegs 99.5c. Freight allowed.

Scrap Metals

Brass Mill Allowances

Ceiling prices in cents per pound for less than 20,000 lb, f.o.b. shipping point, effective June 26, 1951.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	21.50	21.50	20.75
Yellow Brass	19.125	18.875	17.875
Commercial Bronze			
95%	20.50	20.25	19.75
90%	20.50	20.25	19.75
Red Brass			
85%	20.25	20.00	19.375
80%	20.125	19.875	19.375
Muntz metal	18.125	17.875	17.375
Nickel silver, 10%	21.50	21.25	19.75
Phos. Bronze, 5%	25.25	25.00	24.00

Copper Scrap Ceiling Prices

(Base prices, cents per pound, less than 40,000 lb f.o.b. point of shipment)

Group 1: No. 1 copper 19.25; No. 2 copper wire and mixed heavy 17.75; light copper 16.50; No. 1 borings 19.25; No. 2 borings 17.75; refinery brass, 17.00 per lb of dry Cu content for 50 to 60 per cent material and 17.25 per lb for over 60 per cent material. Group II: No. 1 soft red brass 18.50; No. 1 composition borings 19.25 per lb of Cu content plus 63 cents per lb of tin content; mixed brass borings 19.25 per pound of Cu content plus 60 cents per lb of tin content; unlined red car boxes 18.25; lined red car boxes 17.25; cocks and faucets 16.00; mixed brass screens 16.00; zincy bronze solids and borings 16.25.

Zinc Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment) Unsweated zinc dross, 13.75c; new clippings and trimmings, 15.50c; engravers' and lithographers', plates, 15.50c; die cast slabs, min. 90% zinc, 13.75c; old zinc scrap, 12.25c; forming and stamping dies, 12.25c; new die cast scrap, 11.75c; old zinc die cast radiator grille, 11.50c; old die cast scrap, 10.50c.

Lead Scrap Ceiling Prices

(F.o.b. point of shipment)

Battery lead plates, 19.00c per lb of lead and antimony content, less smelting charge of 2 cents per lb of material in lots 15,000 lb or more; less 2.25c in lots less than 15,000 lb, or a flat price of 11.25c a pound of battery plates. Used storage batteries (in boxes) drained of liquid, 7.65c for 15,000 lb or more; 7.45c for less than 15,000 lb. Soft lead scrap, hard lead scrap, battery slugs, cable lead scrap or lead content of lead-covered cable scrap, 17.25c in lots of 20,000 lb or more; 16.50c in lots under 20,000 lb.

Aluminum Scrap Ceiling Prices

(Cents per pound, f.o.b. point of shipment, less than 5000 lb)

Segregated plant scrap: 2s solids, copper free, 10.50; high grade borings and turnings, 8.50; No. 12 piston borings and turnings, 7.50; Mixed plant scrap: Copper-free solids, 10.00; dural type, 9.00. Obsolete scrap: Pure old cable, 10.00; sheet and sheet utensils, 7.25; old castings and forgings, 7.75; clean pistons, free of struts, 7.75; pistons with struts, 5.75.

Steel Bars . . .

Bar Prices, Page 213

Boston—Carbon bar consumers unable to place all their first quarter tickets are crowding into April-June schedules narrowed by continuing defense contracts taking specific tonnage monthly. High carbon flats and shaped bars required for production of files are in good supply. Larger size carbon stock is most extended with cold finished bookings extending into third quarter.

New York—Leading sellers of carbon bars will not open their books for third quarter until around Apr. 1. Cold-drawn and alloy bar books, however have been opened for third quarter due mainly to the fact longer lead time is required.

Pittsburgh—Demand doesn't seem quite as heavy as a few weeks back. However, the mills are turning away second quarter uncashed CMP tickets —military as well as civilian. Material in greatest demand includes sizes over $1\frac{1}{2}$-in. in forging, cold-finished and hot-topped grades. Defense requirements continue strong.

Cleveland—Second-quarter bar mill order books are overloaded with tonnage. Expectations are there will be a substantial carryover into third quarter. Scheduling difficulties are anticipated in second quarter because of the indicated overflow from the first three months of the year.

Los Angeles—There is no indication the "stretch-out" in aircraft production to 1955 will ease fabricators' bar requirements.

Sheets, Strip . . .

Sheet and Strip Prices, Page 213 & 214

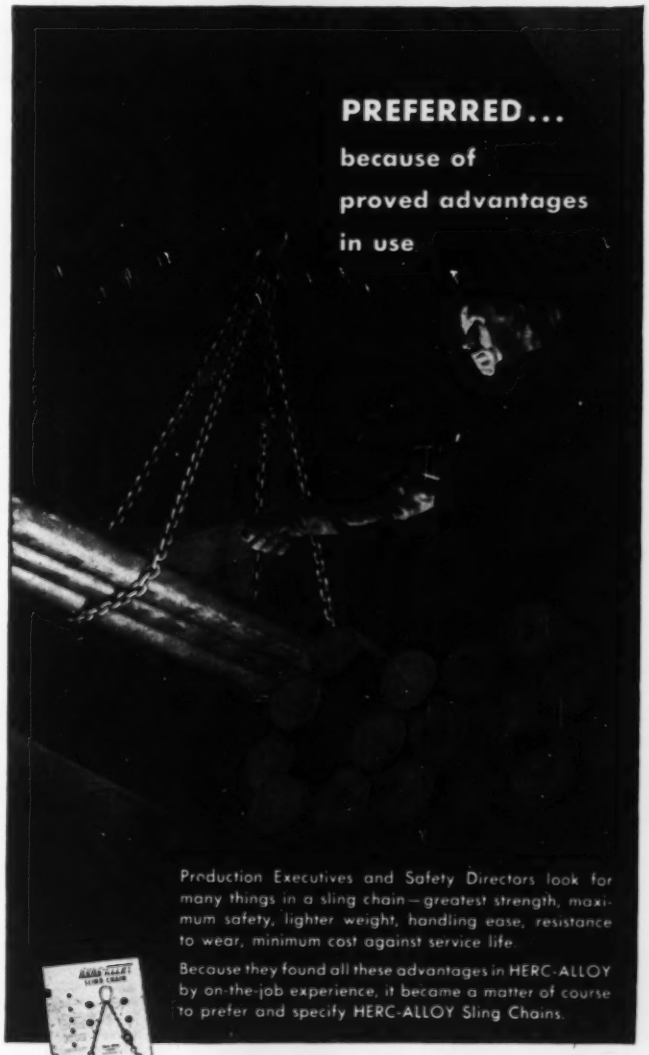
Cleveland — Contradictions are found in the sheet and strip market. In the face of continuing reports of easing supply conditions, indications are the larger mills are booked full for second quarter. In a number of instances tonnage for the period has been declined by the mills. For instance, a buyer sought to place 1500 tons of cold-rolled sheets with a producer reportedly with open tonnage, but was unable to buy a pound. In another instance a manufacturer of automobile mufflers, reportedly holding a large stock of sheets, was found to be over-supplied with wasters and rejects, but was unable to buy 800 to 900 tons of urgently needed cold-rolled primes.

Boston—Only consumers without authorized tickets are in need of cold-rolled sheets, strip and flat-rolled specialties. More difficulty is experienced in placing orders against second quarter tickets on hot-rolled and galvanized sheets, but even these products are loosening up slightly for May or June.

New York—While there is continued easing in demand for cold-rolled sheets and strip, most producers have not opened books for third quarter except for some specialties, such as electrical sheets and stainless. General opening is expected around the middle of this month. Some mills, particularly the non-integrated mills, which in general have been quoting premiums, have capacity available for second quarter tonnage.

Philadelphia—Cold sheets and strip

HERC-ALLOY
SLING CHAINS



Production Executives and Safety Directors look for many things in a sling chain—greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

Because they found all these advantages in HERC-ALLOY by on-the-job experience, it became a matter of course to prefer and specify HERC-ALLOY Sling Chains.

Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

COLUMBUS McKINNON CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corp.)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
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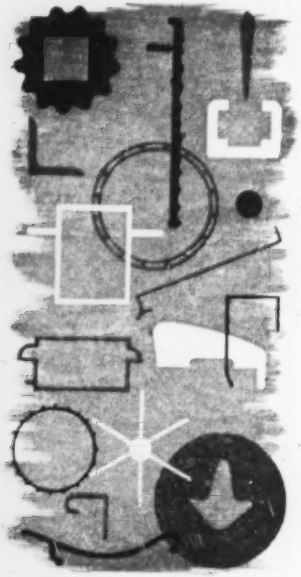

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continue the weakest spot in the steel markets. Impact of this weakness is felt chiefly in conversion and imported sheets which have been moving at premium levels. One leading district consumer is offering a fair tonnage of auto body sheets for resale at cost.

Pittsburgh—Mills are booked full for second quarter. Pressure for tonnage has been tapering off due to production cutbacks in the appliance and automotive industries. Cold-rolled material is loose and currently is moving at about 85 per cent of industry capacity.

Chicago—Despite growing sufficiency of cold-rolled sheets and strip, mills are booked solid through second quarter. Coated products have weakened in consumer inquiries.

St. Louis—Pressure for cold-rolled sheets remains strong despite easing elsewhere.

Birmingham—Mill books are full for second quarter. Pressure for delivery is not quite so strong but this is the only indication of a slowing down in demand.

Semifinished Steel . . .

Semifinished Prices, Page 213

Pittsburgh — District steelmaking operations increased 1½ points to 104 per cent of rated capacity. Wheeling operations dropped ½ point to 100 per cent. Crucible Steel Co. of America twice broke its blooming mill record that had stood since 1946. The first turn rolled an average of 126.5 tons per hour bettering a second shift effort which produced 125.9 tons per hour. Loss of 1500 tons of production at Wheeling Steel's Steubenville Works was caused by a fire in the machine and pattern shops.

Plates . . .

Plate Prices, Page 213

Philadelphia—Demand for heavy gage plate exceeds supply. Producers are booked up solidly for second quarter. Demand for the thicker material reflects particularly requirements for power equipment, pressure vessels and heavy machinery and presses. Also there is a stepping up in shipyard needs.

New York shipbuilding corp., Camden, N. J., booked a Navy contract for two oilers, in addition to three taken a few weeks ago. These five oilers will require 11,000 tons of hull steel apiece, totaling 55,000 tons, including 43,500 tons of plates and 10,000 tons of shapes.

Boston—Plate shops, notably weldments, are aided in placing heavy gage tonnage under order Z-2 covering machine tools. Inventories are not as critical to meet extended backlogs. Small tank inquiry is stronger but more light plates from strip mills are available.

New York—Plate demand is active. There is an easing in requirements for lighter gages, as compared with the heavier, but all thicknesses appear moving briskly.

Pittsburgh—Second quarter books of district mills are filled and uncashed CMP tickets especially for the heavier gages are finding no available rolling time.

Cleveland—It is difficult to tack down reports of easier supply conditions in light plates. While larger supplies are coming onto the market due to greater production on the continuous sheet mills, producers have no difficulty disposing of all their output. They are booked solidly through second quarter and anticipate continued strong demand pressure the remainder of the year.

Chicago—Plate fabricators are assured full operations through 1952. Although steel supply is easier some second quarter tickets are unplaced. Outlook for third quarter is slightly better.

St. Louis—Plate demand is brisk, especially from pipeline builders, tank manufacturers and shipbuilders.

Los Angeles—Plate fabricators' competition is growing but there is no lessening of plate demand.

Structural Shapes . . .

Structural Shape Prices, Page 213

New York—Loosening of governmental restrictions on building will be reflected in mill rollings and fabricating shop operations in second quarter. Additional allotment of 70,000 tons has been made for commercial and industrial construction in the period bringing total allotments for such work to approximately 285,000 tons. This will be well below the 370,000 tons earmarked for the current quarter.

The steel industry, it is reported, will get 40,000 tons less than in the current quarter. Also the aircraft and shipbuilding industries will receive less. Actually only the aluminum industry will get any substantial boost in its second quarter expansion requirements, its allocation amounting to 42,000 tons of shapes against 25,000 tons in the current quarter. Allowances to claimant agencies will be upped somewhat in second quarter as a result of the latest shuffle. The Defense Department will receive 220,000 tons of shapes, increase of 49,000 tons.

Structural awards in January, according to the American Institute of Steel Construction, amounted to 210,563 tons, against 361,373 tons in the like period last year. The January figure includes 18,665 tons of items not previously included in the Institute's statistical figures. These items include inter-company work, export work and galvanized structures. January shipments totaled 241,275 tons, of which 24,912 tons comprised additional items enumerated above. Backlogs Jan. 31 totaled 2,416,042 tons.

Boston—Bulge in bridge tonnage for shop fabrication, last half, 1952, coupled with relaxed restrictions on some types of construction, will contribute toward filling schedule gaps due to easing in industrial expansion. Substantial tonnage is on boards for electric power plants with one contract placed, 2300 tons, Connecticut.

Philadelphia—Government's announced intention of easing limitations on building have found little reflection in this district.

Pittsburgh—District producers are happy about NPA's recent allotment of an additional 70,000 tons of shapes for commercial and industrial construction during second quarter. This action coupled with the "go-ahead"

for over 600 religious, community and municipal building projects during last half of the year will help to support high-level production.

Cleveland—Structural fabricators are encouraged by the easing of government restrictions on certain classes of construction, but they do not anticipate much change in shape supply conditions before closing months of the year. Current interest centers on structural needs for the Ohio turnpike, scheduled to get actively under way late this year.

Birmingham—Mills report an increase in shape inquiries due to relaxation in building restrictions.

Seattle—Fabricators' backlogs are fair but they are actively seeking third quarter business.

Wire . . .

Wire Prices, Page 215

New York—Lower overall production of finished wire products in second quarter appears inevitable with softening demand. Authorizations based on ingot tons rather than finished products make for uneven operations. Automotive orders are slow.

Boston—Second quarter wire schedules are unbalanced with wide openings for May and beyond for more products.

Birmingham—Wire products continue available chiefly on directives. This means little tonnage in the free steel category is available.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 213

Cleveland — Except for a number of small-lot jobs the reinforcing steel market locally is in the doldrums. The slack, partly, is seasonal, but government restrictions on building are the chief factor. Competition for government-approved work is keen, but so far no price shading has been encountered here. Reinforcing bar supplies continue limited but gradual easing is indicated over remaining months of the year. Large volume of potential work is before the market in the way of schools and other public structures. Some of these are likely to become active shortly now that government restrictions on such building have been partially lifted. Currently, chief interest centers on reinforcing requirements for the Ohio turnpike, which appear to have at last won government approval. Indications are steel, largely reinforcing, will be made available for this project beginning fourth quarter. The project, it is estimated, will require in excess of 250,000 tons of steel, including reinforcing bars, structural shapes, plates, etc.

Boston—Bulge in reinforcing steel, concrete steel bars and building mesh, accounts for 3600 tons placed, with pending bridge and housing tonnage heavier. Shop fabricating capacity is taxed and distributors' backlogs extend into thrid quarter.

Chicago—Chicago and the Sanitary District are assured reinforcing steel for 13 sewer and water projects costing $16.5 million.

Seattle—Mills are booking considerable reinforcing bar tonnage in

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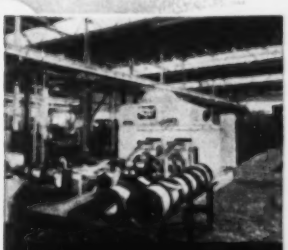
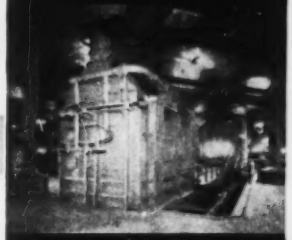


Continental Automatic Strip Production Line consisting of annealer, pickling machine, dryer and coiler



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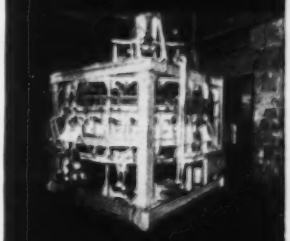

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small lots, less than 100 tons each. Backlogs are down, but still heavier than normal.

Tin Plate . . .

Tin Plate Prices, Page 214

Washington—Three new classifications of irregular or off-grade tin plate and terne plate are established in an amendment to NPA's tin plate and terne plate order M-24. Specifically they are unmended menders, unassorted temper tin plate, and other coated secondaries. The move was taken to simplify disposal of off-quality products.

Pittsburgh—Mills are hoping some decontrol can be effected on secondary tin mill products. Regardless of the possibility of a general steel strike and increases in tin plate prices there has been noticeable lagging in demand for second quarter mill bookings.

Tubular Goods . . .

Tubular Goods Prices, Page 217

Birmingham—McWane Cast Iron Pipe Co. received Washington approval for a $3 million addition to its facilities here.

Los Angeles—Public utilities' rising requirements reflect confidence in easing of tubular steel supplies.

Seattle—Demand for cast iron pipe is expanding seasonally. Takima, Wash., opens bids Mar. 10 for 500 tons. Bids are asked for Apr. 2 on 10,600 feet of water mains for Cordova.

Pig Iron . . .

Pig Iron Prices, Page 212

Boston—Numerous foundries lack defense work to balance reduced demand for civilian goods castings. Exceptions are shops supplying machine tool builders. Less foreign tonnage in foundry grades, small shipments from Buffalo and other districts, plus relatively high ratio of iron in melts, contribute to demand on the Everett furnace which is channeling current production to consumers with little tonnage going to stockpile.

New York—District pig iron salesmen are having little difficulty in disposing of their tonnage—but they note an easing in pressure from the gray iron foundries. Demand for gray iron castings lags and little early improvement is indicated. In general, the foundries are using more pig iron in relation to their consumption of scrap than at any time in recent months.

Philadelphia—Pig iron is in tight supply and may become tighter in April and May when the soil pipe foundries expect an upturn in operations.

Pittsburgh—No change has been noted in the recent easing in demand for merchant iron in this district. Heavy castings are holding up but the slack in lighter consumer castings is resulting in lessened pig iron demand.

Cleveland—Some pickup in activity in the pattern shops is noted. This is seen as possibly hinting an early quickening of foundry operations.

Chicago—Foundries serving machine tool, heavy machinery and defense needs are fairly busy but jobbing shops are on curtailed schedules.

St. Louis—The shutoff of supplies from Granite City Steel's blast furnaces is spurring demand for foundry pig iron. No deliveries have been made from these stacks since Jan. 28, when one went down for repairs.

Birmingham—Pressure is off merchant iron melters. No surplus pig iron, however, is reported.

Seattle—Price on foreign iron coming in here averages $10 per ton above that on domestic grades. Larger stockpiles of domestic iron have cut down foreign buying.

Scrap . . .

Scrap Prices, Page 220

Pittsburgh — More optimism is noted throughout the district regarding open-hearth scrap. Collections are good and steelmakers hope to keep steel production in high gear. Stocks are low at a number of plants but they are holding their own. Cast is in abundant supply but little evidence is seen of price shading or freight concessions. Mill scale recovery in the form of iron granules — from district rivers is being carried on for Jones & Laughlin Steel Corp. and others by dredging operations.

Washington — OPS last week through amendment 29 to GCPR, moved to make clear sales of used rails, trackwork, rolling stock and other demolition projects used for steel scrap continue subject to price control. It had been assumed by the railroads these had been removed from control Dec. 26, 1951, through amendment 26.

New York—Cast grades are weak with some business in cupola cast consummated at $49.50 delivered, about $2.50 under ceiling. Steel scrap is steady. Top grades are scarce, but there is a better flow of secondary grades, with consumers more selective in acceptances.

Philadelphia—Good grades of steel scrap continue highly scarce, but the overall situation is less critical, being reflected by the highly selective measures most mills are taking in accepting tonnage. No. 2 bundles are now being closely inspected, with rejections heavy. Collectors are showing some concern over the turn of events. Cast grades continue in free supply. Some larger consumers of

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cupola cast have closed on tonnage at $1.50 under ceiling, with a $3 limitation on rail freight or trucking.

Cleveland—Steel scrap supply continues limited, but the market tone is softer. Easiness is largely psychological, arising from fears among some dealers demand is contracting. Small, premium-priced steel mills are taking in less tonnage and appear fairly comfortably stocked. Major mills, however, still badly in need of material, are taking all the tonnage offered though exercising greater selectivity in acceptances. Some of this is due to more extensive inspection by government agents. Cast grades are plentiful, especially unstripped motor blocks. Price shading appears confined to freight absorption, largely on remote shipments.

Chicago—Heavy snow and severe cold are interrupting scrap yard operations and shipments again but no serious situation is likely. For several weeks mills have been receiving material in excess of the melting rate. Steelmaking grades remain tight but inspection for quality is more rigid. Cast iron grades are in excess of demand and are moving at $2 to $5 below ceiling.

St. Louis—Bad weather cut shipments and yard preparation work. Overall, steel scrap is easier. Most mills have up to 30 days supply. Buyers are reducing the springboard they will pay.

Birmingham—Steel scrap is somewhat easier. Little demand for cast grades is reported with soil pipe foundries on reduced schedules.

Los Angeles—Demand for steelmaking scrap continues strong. Melters are uninterested in foundry scrap and there are no buyers for cast at any price. Collections of dormant steel scrap at plants of eight West Coast aircraft plants average 300 tons monthly.

San Francisco—Receipts of open-hearth grades of scrap by one large consumer have been above the consumption rate the last few weeks. Inventory position is improved. Steel scrap prices are firm at ceiling levels. Cast scrap is quoted approximately $5 below ceilings on metropolitan generated material.

Seattle—Bethlehem Pacific Coast Steel Corp. has withdrawn from the cast iron scrap market for an indefinite period. It has been able to build a comfortable inventory. Currently, cast scrap is quoted $5 per ton below OPS ceiling. Steel grades are firm at ceiling, but shipments are expected to improve as the spring advances. Cast scrap supply is in excess of foundry requirements.

Rails, Cars . . .

Track Material Prices, Page 215

New York—Car builders will come in for heavier steel allocation in third quarter, it is indicated. They are receiving sufficient tonnage to produce 6000 cars per month plus 1800 tank cars for the entire quarter. In second quarter they are scheduled to receive at least enough steel to enable them to maintain that rate of production in the third three-month period. Some car builders are in such good shape on steel for handling restricted second-quarter car building

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schedules they have returned their tickets to Washington on certain products.

Warehouse . . .

Warehouse Prices, Page 219

Washington—Holes in OPS warehouse ceiling price regulation 98 are plugged by amendments effective Mar. 4, changes being relatively minor. Some price increases are allowed, principally affecting reusable iron and steel pipe, new heavy gage boiler tubes, and imported industrial steel products.

Merchant wire products markup is raised from 20 per cent to 25 per cent, while the ceiling on reusable pipe is boosted from 80 to 95 per cent of the jobber ceiling price for comparable prime products. For reconditioned reusable boiler tubes and industrial products, including bars, sheets, and structurals, current ceilings are held at 80 per cent of the price for new prime material.

Under the amended regulation, hot-rolled and cold-rolled electrical sheets are added to the industrial products section of the order. Price markup permitted, 56 per cent of mill base, applies uniformly over the country.

Two pricing methods are provided for cold-rolled strip, depending on whether material is bought as strip from the mill, or is slit from sheets.

Cleveland—Steel distributors deny widely circulated reports their warehouses are bulging with tonnage they find difficult to move. Except for cold-rolled sheets, strip and a few specialties, stocks are not much improved over a year ago. Survey shows the industry's inventories are highly unbalanced, overall running to no more than 45 per cent of 1949 tonnage. Some light, flat-rolled steel has been offered at bargain prices in recent weeks. But such offers have been by brokers and small operators, many of whom had been selling in "gray" markets. These bargains are not typical for the industry, it is insisted, with ceiling price schedules, adjusted from month-to-month under OPS regulations, firmly held. Legitimate distributors are apprehensive that NPA, misled by erroneous reports of excessive warehouse stocks, may move to cut back distributors' receipts from the mills under order M-6A from 100 per cent of base period tonnage to the former 85 per cent.

Philadelphia—Warehouses are able to build up some inventory in sheets and light plates but find it difficult to keep ahead on bars, heavy plates and the general run of warehouse shapes.

Pittsburgh — Operators complain about unbalance size-wise in many items. All flat-rolled items are easier except galvanized.

Chicago—Warehouses report overall demand for most products well maintained. Matching orders with available stocks remains a problem.

Birmingham—Receipts from mills are improved and warehouse shipments remain steady.

Los Angeles — Warehouses have more steel to sell with demand falling. Fabricators' inventories are in better shape.

San Francisco—Stocks are a little better, but there is no evidence of price markdowns.

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 217

Pittsburgh—Jones & Laughlin Steel Corp. plans a battery of coke ovens at its Pittsburgh Works coke plant at Hazelwood costing approximately $23 million. Each will have monthly capacity of 500 tons.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 217

Cleveland—Automotive and other civilian durable goods cutbacks have eased demand pressure for industrial fasteners slightly. Slower market pace is especially noticeable in the smaller sizes. Larger items appear under as great pressure as ever, reflecting rising production of heavy equipment on defense account.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4600 tons, galvanized transmission towers for Bonneville Power Administration, to Creamer & Dunlap, Tulsa, Okla., low $1,238,345.

1500 tons, twine mill building, International Harvester Co., New Orleans, to Jones & Laughlin Steel Corp., Pittsburgh; R. P. Farnsworth & Co., New Orleans, general contractor.

1500 tons, boiler supports, Combustion Engineering-Superheater Co., Rockdale, Tex., to Simon Holland & Son Inc., Brooklyn, N. Y.

1500 tons, transmission towers, Pennsylvania Power & Light Co., along the Williamsport-Sunbury line in Pennsylvania, to Bethlehem Steel Co.

1100 tons, diesel inspection facilities, New York Central, Buffalo, to Central Steel Construction Co., that city.

440 tons, shop building, Martin-Rockwell Corp., Falconer, N. Y., to Bethlehem Contracting Co., Bethlehem, Pa.; Wigton-Abbott Corp., Plainfield, N. J., general contractor; reinforcing to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, state bridge, Hudson county, New Jersey, through Franklin Contracting Co., to Phoenix Bridge Co., Phoenixville, Pa.

350 tons, electric station, Central Arizona Light & Power Co., Phoenixville, Ariz., to Allison Steel Mfg. Co., that city.

300 tons, Men's Sport Co. building, Ithaca, N. Y., through Vermilyea Brown Co., New York, to Ernst Iron Works, Buffalo.

275 tons, bridge, fabricated and delivered, Oakland, R. I., direct to Rhode Island Division of Purchases, to Tower Iron Works, Providence, R. I.

270 tons, diesel engine parts, American Locomotive Co., Schenectady, N. Y., to Bethlehem Steel Co.

250 tons, addition, St. Clare's Hospital, West 51st street, New York, to Bethlehem Steel Co.

230 tons, compressor building, American Cyanamid Co., New Orleans, to unnamed fabricator.

150 tons, state bridges, Chester and Craftsbury, Vt., to Vermont Structural Steel Co., Burlington, Vt.; bought by state.

150 tons, school, Fort Monmouth, N. J., to unnamed fabricator.

100 tons, housing project, West Roxbury-Jamaica Plains district, Boston, to West End Iron Works, Cambridge, Mass.; S. & A. Allen Construction Co., Boston, general contractor.

STRUCTURAL STEEL PENDING

2900 tons, tunnel supports, framing, gates, hoists, etc., Palisades dam, Idaho; bids to Bureau of Reclamation, Idaho Falls, Apr. 1.

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1900 tons, New York state bridge work, Montgomery county, New York; bids Mar. 12.
850 tons, teaching hospital, University of Oregon, Portland; plans in preparation; bids soon.
652 tons, state bridge, Essex county, New Jersey; bids Mar. 13.
600 tons, miscellaneous buildings, Du Pont interests, Newport, Del.; bids Mar. 10.
600 tons, power house, American Viscose Co., Roanoke, Va.; bids Mar. 10.
600 tons, warehouse and repair facilities, Ft. George Meade, Maryland; George A. Fuller Co., New York, apparently low bidder on overall contract.
475 tons, warehouse, Quonset Point, R. I., naval air base; bids Mar. 11.
400 tons, field house, Elelson air field, Alaska; bids to U. S. Engineer, Seattle, Mar. 12.
310 tons, traffic interchange structure, Cranston-Warwick, R. I.; bids Mar. 19.
300 tons, Washington state bridge, Cowlitz county; general contract to Anderson Bridge Co., Tacoma, low $262,900.
260 tons, McNary dam machine shop; general contract by U. S. Engineer to Howard Halvorson Co., Portland, Oreg., $394,057.
180 tons, motor pool garage, Fort Lewis, Wash.; general contract to A. G. Homann, Olympia, Wash.
100 tons, Holy Child Academy addition, Portland, Oreg.; ready for bids.

REINFORCING BARS . . .

REINFORCING BARS PLACED

800 tons, five Army warehouses, Auburn, Wash., to J. D. English Steel Co., Tacoma, Wash.; Zoss Construction Co., Portland, Oreg., general contractor.
250 tons, twine mill building, International Harvester Co., New Orleans, to Jones & Laughlin Steel Corp., Pittsburgh; R. F. Farnsworth & Co., New Orleans, general contractor.
120 tons, infirmary building, state hospital, Canton, Mass., to United States Steel Supply Div., U. S. Steel Co., Cambridge, Mass.; Park Construction Co., Boston, general contractor; Builders Iron Works, Somerville, Mass., structural steel.
100 tons, fire storage warehouse, Mt. Rainier Ordnance Depot, to Bethlehem Pacific Coast Steel Corp., Seattle; J. H. Sellen Construction Co., Seattle, general contractor.

REINFORCING BARS PENDING

6500 tons, Palisades dam, Snake river; bids to Bureau of Reclamation, Idaho Falls, Ida., Apr. 1.
4000 tons, Fort Lewis, Wash., barracks; McDonald-Woodworth-Wright, Seattle and Tacoma, joint low bid, $9,368,994 to U. S. Engineer, Seattle.
1000 (estimated), University of Washington $2½ million men's dormitory, Seattle; bids to Board of Regents, Seattle, Apr. 1.
120 tons, Washington state girder span, Benton county; general contract to Neil F. Lampson, Kennewick, low $84,478.
100 tons, including miscellaneous, Ringold pump plant, Columbia Basin project; bids to Bureau of Reclamation, Ephrata, Wash., Mar. 27.

PLATES . . .

PLATES PLACED

1700 tons, four tanks, Socony-Vacuum Oil Co., East Chicago, Ill., to Bethlehem Steel Co.
1500 tons, oil tanks, for erection in several states, Texas Co., to unnamed fabricator.
1000 tons, tanks, Sun Oil Co., Marcus Hook, Pa., to Chicago Bridge & Iron Works, Chicago.
800 tons, evaporators, tanks, etc. for several Washington state pulp mills, to Hydraulic Supply Mfg. Co., Seattle.
670 tons, two tanks, Shell Oil Co., Wood River, Ill., to Graver Tank & Mfg. Co. Inc., East Chicago, Ind.
560 tons, boiler steel, Foster Wheeler Corp., New Orleans, to Austin Co., Cleveland.
450 tons, tanks, Sun Oil Co., Tonawanda, N. Y., to Hammond Iron Works, Chicago.
200 tons, tanks, New Haven Terminal Co., New Haven, Conn., to Bethlehem Steel Co.

PLATES PENDING

1500 tons, penstocks and outlet pipes, Palisades dam project, Snake river, Idaho; bids to Bureau, Idaho Falls, Apr. 1.

PIPE . . .

CAST IRON PIPE PENDING

500 tons, assorted sizes, municipal stockpile; bids to Yakima, Wash., Mar. 10.
Unstated, 2400 feet, 16 to 6 inch, Anchorage, Alaska; Valley Construction Co., Seattle, low $292,286 for cast iron, $190,460 for steel.
Unstated, 5220 feet, 8 inch, Class 150 and fittings, bids in to Pullman, Wash., Mar. 4.
Unstated, 18,810 feet, 8 and 4 inch, for King County district No. 79, Washington; bids to Parker Hill & Ingman, engineers, Seattle, Mar. 12.
Unstated, 10,600 feet mains and distribution pipe, for Cordova, Alaska, system; bids to Alaska Public Works, Juneau, Apr. 2.

STEEL PIPE PENDING

Unstated, 4100 feet, 12 inch; bids to Della Livingood, clerk, Union Gap, Wash., Mar. 7, city will furnish materials.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Manistique & Lake Superior, one 660-hp diesel switcher, to American Locomotive-General Electric Companies, Schenectady, N. Y.
New York Central, twenty-four 1600-ton diesel-electric units, to American Locomotive-General Electric Companies, Schenectady, N. Y.

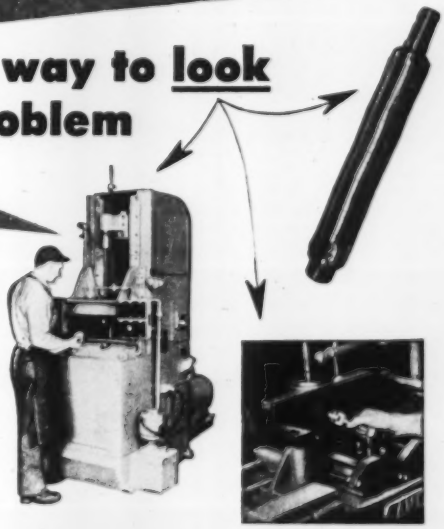
RAILROAD CARS PLACED

Chicago, Milwaukee, St. Paul & Pacific, 100 log flat cars, to its Tacoma, Wash., shops.
Delaware & Hudson, one 246-ton flat car, to own shops.

RAILROAD CARS PENDING

Western Pacific, 100 seventy-ton gondola cars and 100 seventy-ton ballast cars; bids asked.

There's more than one way to look at your broaching problem



There are always *three* elements to consider in any broaching process . . . the machine . . . the broaches . . . the fixture to hold the work. Each, must be properly designed with the others in mind to obtain the greatest production at lowest cost.

Every broaching problem solved the American-Way *is* engineered with these three elements in mind . . . because American engineers are trained and experienced in the design of all three . . . machines . . . tools and fixtures.

So if you need broaches . . . machines . . . fixtures . . take advantage of broach engineering the American-Way. You'll be sure of the right tools, the right machines, the right fixtures . . . every time. A part-print and process information are all we need. There's no obligation of course. Address Dept. S.

AMERICAN *American* BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN
SUNDSTRAND

NO GEARS — NO CHAINS

NO TROUBLESOME WORKING PARTS

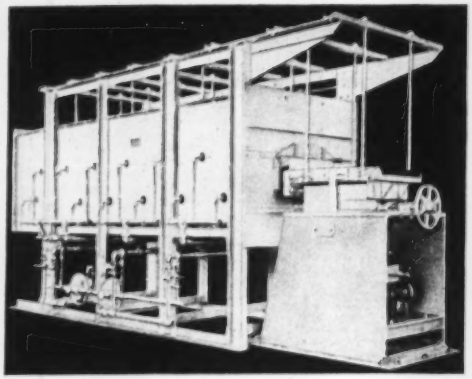
to be affected by interior heat

IN OPERATION—

The full muffle swings from the superstructure and an automatic mechanical movement at the end of each stroke, advances the work.

CLEAN HARDENING—

Tools, springs, chain parts, pins, screws, balls, nuts, stampings, ball-races, pen-points and instrument parts are some of the items economically, efficiently and dependably hardened in these furnaces.



THE AGF RECIPROCATING FURNACE
Model No. 191, Full Muffle, continuous.

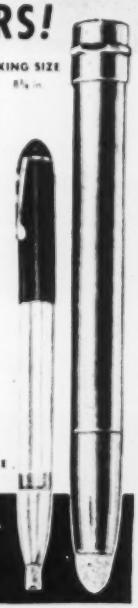
This controlled Atmosphere Furnace is widely popular. It comes in five sizes ranging in capacity from 10 to 1200 lbs. per hour.

Write for full information and price, indicating the products you wish to heat treat and production required.

AMERICAN GAS FURNACE CO
996 LAFAYETTE STREET, ELIZABETH 4 N. J.

Drawn with a FLO-MASTER

In OUR Plant we mark parts in COLORS!



KING SIZE 8½ in.

Yes, in *colors* for easier assembling, stocking, identification, etc. And industry is finding the Flo-master Felt-Tip Marker ideal for *all* types of marking. Its felt tip glides over any surface—metal, plastic, wood, etc. with broad, bold lines or fine lines. Flo-master semi-opaque inks—waterproof, non-smudging, fast-drying—come in a wide range of colors.

For light colored surfaces, use Transparent Inks with "POCKET SIZE" Flo-master. For dark, hard-to-mark surfaces, use Semi-opaque Inks with the "KING SIZE" Flo-master.

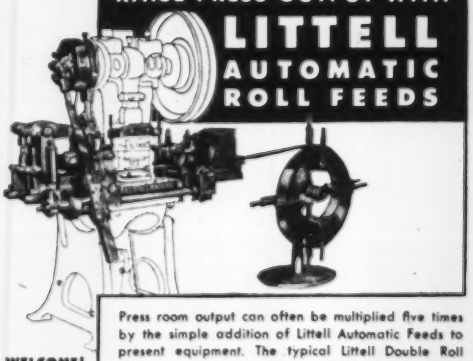
Ask your supplier or write to Cushman & Denison Mfg. Co., Dept. X-1, 153 W. 23rd St. N. Y. 11

POCKET SIZE 6¼ in.

Flo-master
FELT-TIP MARKER

RAISE PRESS OUTPUT WITH

LITTELL AUTOMATIC ROLL FEEDS



Press room output can often be multiplied five times by the simple addition of Littell Automatic Feeds to present equipment. The typical Littell Double Roll Feed shown here grips the stock on both sides of the die to assure maximum traction and feeding power. Stock is easier to start and finish in progressive die work. No hand feeding at either end of the stock. Rack and pinion drive provides the smoothness and the gradual acceleration and deceleration of feed rolls for a truly accurate feed. Standard Littell Automatic Feeds serve all types and sizes of presses, handle all standard widths and thicknesses of stock.

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WHEN YOU BUY FROM LITTELL . . . YOU PURCHASE A PACKAGE OF SATISFACTION

Metalworking Briefs . . .

CONSTRUCTION—ENTERPRISE—ORGANIZATIONAL CHANGES

Fabricating Plant Completed

Fabricators Steel Corp., Bladensburg, Md., completed construction of its plant and general offices in that city. It is equipped with facilities for the fabrication on and warehousing of structural steel and reinforcing bars. B. C. Thomsson was appointed vice president and general manager of the new steel company. Edward Stern, formerly assistant general manager for Allied Metals Co., Niles, O., was named assistant general manager of the company and is in charge of warehouse sales. Harry S. Brown is treasurer.

Crucible Moves Main Offices

General offices of Crucible Steel Co. of America are established in Pittsburgh. W. H. Colvin Jr., president, will establish an office in that city. Executive headquarters of the company are being returned to Pittsburgh where they were located from the founding of the company in 1900 to 1921. For the last 31 years general offices were in the Chrysler building, New York, where a large office will remain.

Ferro Buys Wel-Met Interest

Ferro Corp., Cleveland, will acquire a 50 per cent interest in the Wel-Met Co., a concern engaged in powder metallurgy at Kent, O., and Salem, Ind. R. A. Weaver is chairman of the Ferro board of directors while T. L. Robinson is president of Wel-Met.

Abrasives Firm To Build

Electro Refractories & Abrasives Corp., Lackawanna, N. Y., announced it will erect a $550,000 plant for expanded production of a new industrial product, a precision type grinding wheel for the automotive and machine tool industries.

Canadian Plant Dedicated

Canadian Steel Improvement Ltd., subsidiary of Steel Improvement & Forge Co., Cleveland, dedicated its plant located near Toronto in Etobicoke, Ont. This plant will forge the compressor blades and turbine buckets used in jet aircraft engines.

Orinoco Awards Contract

Orinoco Mining Co., subsidiary of U. S. Steel Corp., New York, awarded a contract to Link-Belt Co., Chicago, for the design and construction of an iron ore handling and storage system at Puerto Ordaz, Venezuela. McDowell Co., S. A., Caracas, Venezuela, and Wellman Engineering Co., Cleveland, are associated with Link-Belt in this project.

Liquid Meter Output Gains

Buffalo Meter Co., Buffalo, is increasing production of liquid meters. About 70 per cent of the plant's current production is for defense-supporting industries.

Standard Improves Facilities

Standard Railway Equipment Mfg. Co., Chicago, awarded a contract to F. H. McGraw & Co., New York, for the installation and rearrangement of equipment at the company's Hammond, Ind., plant. As part of the contract, a special 4000-ton Bethlehem press will be installed.

Bohalco Opens Warehouse

Bohalco Inc., iron and steel manufacturers' agent, opened new offices and a warehouse at 6161 Maywood Ave., Huntington Park, Calif.

Plans Large Plant Addition

General Fireproofing Co., Youngstown, manufacturer of metal office furniture, will begin constructing a large plant addition May 1. Operations are expected to begin in the fall. The structure will cost about $750,000 and will house about $1 million worth of equipment.

Colonial Bushings Expands

Colonial Bushings Inc., Detroit, completed construction of its plant at 31780 Groesbeck Highway, Fraser, Mich. Full production on a higher output level is expected to be reached by mid-March.

Stokes Makes Appointments

F. J. Stokes Machine Co., Philadelphia, appointed Joseph D. Robertson and Robert M. Krause to its Philadelphia and Cleveland offices, respectively. The firm makes tabletting presses, plastics molding presses, powder metal presses, vacuum pumps and gages, vacuum processing and pharmaceutical manufacturing equipment.

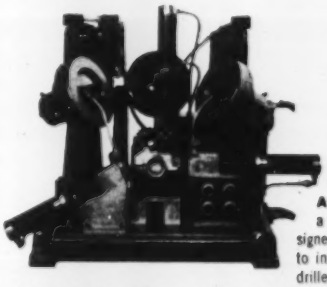
Simonds Names Distributor

Simonds Saw & Steel Co., Fitchburg, Mass., manufacturer of cutting tools, appointed Ducommun Metals & Supply Co., Los Angeles, as a distributor for its products to western industry. Ducommun maintains branch offices in San Francisco, Salt Lake City, Utah, Fresno, Bakersfield, San

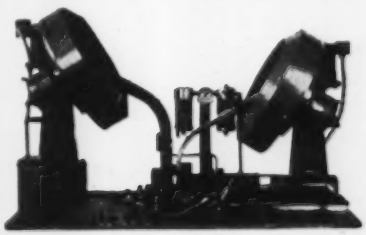
FREE IT FOR MORE IMPORTANT WORK— BY USING

DPS *Motorized* HOPPER UNITS

Modern production demands the speed and accuracy of this great aid to SELECTIVE FEEDING. It makes slow, manual methods obsolete and releases "frozen" manpower for more productive work. D.P.S. Motorized Hopper Units select, orient and feed production parts of a wide variety to a given position for primary and secondary operations. They are readily adaptable to all types of standard production equipment and special machines that would otherwise require constant attention by an operator.



At left is illustrated a special machine designed and built by D.P.S. to insert lead balls into drilled holes in a carburetor body, showing how our selective feeding device eliminates the slow, tedious hand insertion of the balls. The operator simply places the carburetor body in the fixture and presses a foot valve, three lead balls being simultaneously pressed into position—time saving, 66⅔%.



Above—The problem in this application was to insert a pal nut into a deep drawn stamping, which served as a base for a lamp finial. A double selecting problem existed, both in the selection of the pal nut and the stamping. The hand operation required that the operator pick up the stamping, insert the nut partially by hand, and finish the pressing operation by use of a small hand press. The Hopper Unit as a motorized selective feeding device entirely eliminated the manual element and made it possible to provide a completely automatic machine that more than doubled the total previous output of five operators.

SEE US AT THE A.S.T.E. SHOW, MARCH, CHICAGO, BOOTH NO. 140

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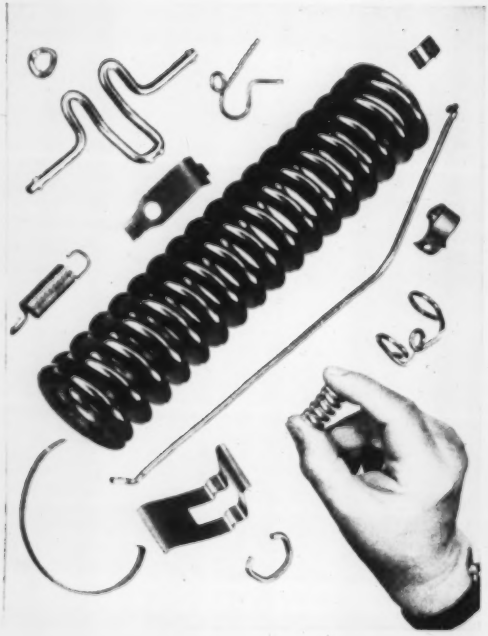
• Business for you in being able to offer products with springs that will give trouble-free service . . . make mechanisms more efficient! If you need better springs—springs that can take more than their share of tough usage, call on U. S. Steel Wire Spring. We have the answer here!

No order too large or too small



The U. S. STEEL WIRE SPRING Co.
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Of course not — because it doesn't pay. Likewise metal cutting machines less modern than the spin-dry washer do not pay.

Your machine tools were bought for one purpose — to make parts at a profit. Put modern RACINE Power Saws into your production line to increase output and improve the quality on all cut-off work. These machines save material and man-hours. They operate with low maintenance and without down-time. Costs come down as your production goes up.

A range of models and all capacities from 6" x 6" to 20" x 20" meet every need. Single purpose and fully automatic bar-feed units save money in every shop. Write today for free production estimates on your own specific jobs. RACINE TOOL & MACHINE CO., 1769 State St., Racine, Wis.

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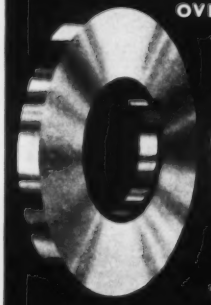
GANG SLITTING KNIVES
OVER 30 YEARS EXPERIENCE



Standard for Service and Durability. Ground to extremely close Tolerances and Finish. Made by *Toolmakers.*

COWLES TOOL COMPANY
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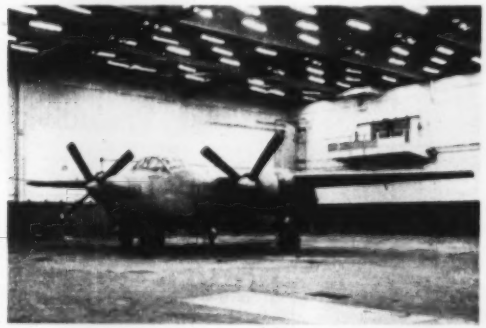


SAVAGE WITHOUT TEETH: The gun mounts were removed and other modifications made to convert North American's Savage attack bomber into a photo reconnaissance plane. Now in production at the company's Columbus, O., plant, Savage AJ-2P mounts 18 cameras and is the heaviest of the Navy's carrier-based operational planes

Diego, Calif., and Phoenix, Ariz. Ducommun enlarged the sales staff of its office in Salt Lake City.

Aetna-Standard Buys Unit

Aetna-Standard Engineering Co., Pittsburgh, purchased the Rubber and Plastics Machinery Division, National-Erie Corp., a wholly-owned subsidiary of Bucyrus-Erie Co., Erie, Pa. Aetna-Standard will manufacture the machinery products in its Warren, O., plant.

Reliance Moves Two Offices

Reliance Electric & Engineering Co., Cleveland, moved its district sales offices to larger quarters at 12326 Hamilton Ave., Detroit; and at 13967 Cedar Rd., Cleveland.

Standard Steel Opens Plant

Standard Steel Fabricating Co. Inc., Seattle, opened a new plant at 8155 First Ave. S. with complete equipment for general work. Its former plant on Harbor Island was destroyed by fire several months ago. Equipment was salvaged and installed at the new location.

Sahlin Appoints Distributor

Sahlin Engineering Co., Birmingham, Mich., designer and manufacturer of automatic press unloaders and special material handling devices, appointed C. T. Hansen & Co., San Francisco, as its West Coast sales representatives.

Chevrolet Plans Unchanged

Chevrolet Motor Division, General Motors Corp., will complete construction of its $30 million facilities in Tonawanda, N. Y., despite a downward revision by the government of its need for Wright aircraft engines. Chevrolet had ample time to study the government's new schedule for slower and fewer deliveries of aviation engines before the division awarded contracts totaling several millions of dollars for completion of the structures currently being built.

Laclede-Christy To Rebuild

Rebuilding of the Laclede-Christy Co.'s clay refractories plant in Canon City, Colo., destroyed by a $100,000 fire last September will start immediately with completion scheduled in 60 days. Project was delayed for a study of the area's clay resources. New deposits of high quality clay, sufficient for 25 years' needs, were discovered.

Michigan Crane Moves

Michigan Crane & Conveyor Co. moved to larger quarters at 115 McKinstry St., Detroit. The company manufactures cranes, conveyors, furnace loaders, miscellaneous fabricated steel products and other types of materials handling equipment. A. B. Bogle is president.

Fauver Opens Dayton Branch

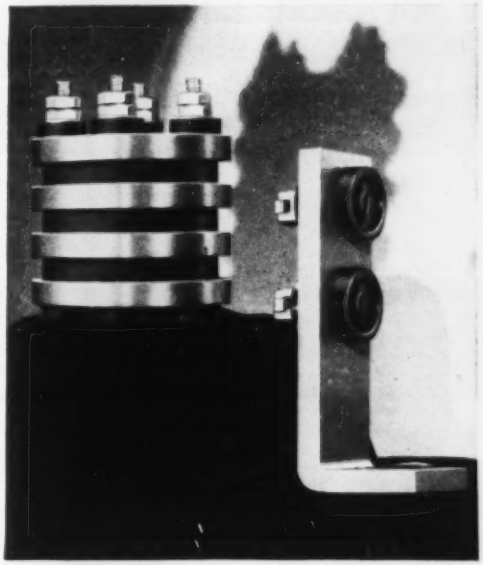
J. N. Fauver Co. Inc., Detroit, opened a Dayton, O., branch at 1534 Keystone Ave. The company offers engineering facilities in the field of lubrication, hydraulics and pneumatics.

Cleaver-Brooks Names Agent

Cleaver-Brooks Co., Milwaukee, appointed V. N. Harwood Co., Buffalo, as its representative for sale of equipment for the generation and utilization of heat.

Hackett Opens Branch

J. Lee Hackett Machinery Co., Detroit, opened a branch office at 1144 Hanna Bldg., Cleveland. This branch represents Mattison Machine Works, Greenlee



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● *to your Special Requirements*

Welco Collector Rings are designed and built to your special requirements. Send us complete engineering data as to size, number of rings, amperage and operating conditions. If your needs are answered by one of our standard models we will send you full information on these. All rings are bronze and are furnished complete with brass brush holders and brushes.

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Ames PORTABLE HARDNESS TESTERS

Show the exact hardness of your metals before and after heat-treating, to reduce tool wear and breakage and to speed up production.

Ames Portable Hardness Testers are light in weight and are carried to the work. Tests are easy to make and accurate, requiring no skill.

Ames Portable Testers are used to test flats, rounds, strip, tubing, wire, etc., without cutting off specimens. Saws, gears, knives and large irregular shapes are tested while assembled. Readings are direct in the Rockwell Scales.

Send today for interesting folder "Rockwell Hardness Testing Made Easy"

AMES PRECISION MACHINE WORKS
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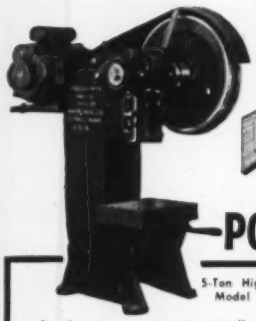
Can YOU Use a High Production PRESS-RITE 5 TON POWER PRESS?



5-Ton High Production Press-Rite—Bench Model (Floor Model Also Available)

Small and compact, yet ruggedly built for long, hard usage, the Press-Rite 5-ton High Production Power Press can be enormously useful in scores of applications. Ideal for punching, stamping, forming, blanking and drawing operations, this Press is loaded with extra features such as:

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- Special Alloy Frame—For maximum rigidity, minimum deflection.
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5 TO 85 TONS

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IF IT'S *RIVETED* YOU KNOW IT'S SAFE
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WE FEATURE SPECIAL PUNCHES & DIES
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BROWNING ELECTRIC TRAVELING CRANES AND HOISTS
up to 125-TON CAPACITY
VICTOR R. BROWNING & CO., INC. WILLOUGHBY (Cleveland), OHIO

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Bosh Plates Mantle Plates Cinder Notches
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SMEETH-HARWOOD COMPANY
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PERFORATED METALS
TO YOUR REQUIREMENTS
FOR
ALL INDUSTRIAL USES
ARCHITECTURAL GRILLES
SEND FOR CATALOG NO. 35
DIAMOND MFG. CO.
BOX 32 WYOMING, PA.

Bros. Co. and several other machine tool builders. J. Alden Rigdon, formerly vice president of Union Tool Corp., Warsaw, Ind., is in charge of the Cleveland branch.

Brunner Plans Full Output

Brunner Mfg. Co., Utica, N. Y., spent about $400,000 during the past year on capital improvements and increased production facilities. Full production on prime contracts and subcontracts for the Army is scheduled to start in the second quarter of this year.

Opens New Orleans Branch

A combined regional office and warehouse was established at 1410 S. Jefferson Davis Parkway, New Orleans, by Cooper-Bessemer Corp., Mt. Vernon, O. T. E. Kraner is the New Orleans branch manager.

Castings Firm Changes Name

Name of American Boiler & Foundry Co., a division of Maumee Malleable Castings Co., Toledo, O., was changed to American Foundries Co. Operations are concentrated on semi-production, job and specialty, alloyed and gray iron castings.

Machine Works Organized

A business name was filed in the clerk's office, Erie County, New York, for Industrial Machine Works, 545 Elm St., Buffalo, by Daniel Zagorski, Leo J. Binner, Jr. and Harry Kura.

Arwood Buys Metalmold

Arwood Precision Casting Corp., Brooklyn, N. Y., acquired the capital stock of Metalmold Corp., Derby, Conn. Metalmold will be operated as a wholly-owned subsidiary in addition to the Arwood plants in Groton, Conn., Tilton, N. H., and Brooklyn, N. Y.

Allis-Chalmers Names Agent

Roach Equipment Mfg. Co., Tulsa, Okla., was named a distributor in that territory for motors and transformers produced by Allis-Chalmers Mfg. Co., Milwaukee.

Association Changes Name

s Automotive & Aviation Parts Mfrs. Inc. changed its name to Automotive Parts Mfrs. Association. Main offices are at 800 Michigan Blvd., Detroit.

Carolina Steel Issues Book

Carolina Steel & Iron Co., Greensboro, N. C., issued a book depicting various phases of its operation. The book also pays tribute to Salem Steel Co., Winston-Salem, N. C., an affiliate. It points up the part played by these two companies in the recent change from an agricultural economy to an industrial economy in the South. Carolina Steel was organized in 1919 and purchased Salem Steel in 1949. The combined companies fabricate over 21,000 tons of structural steel annually.

Doehler-Jarvis Moves Office

Entire executive offices of Doehler-Jarvis Corp., New York, are being moved to a new office building adjacent to the corporation's plant in Toledo, O. The only exception is H. H. Doehler, honorary chairman of the board, who will retain his headquarters at 386 Fourth Ave., New York.

Metalworking Firm Formed

Gallagher - Kaiser Corp. opened a business at 7511 Lyndon, Detroit, to design, produce and install ventilators, dust collectors, ovens, paint spray booths and washing machines for industrial use. Edward F. Gallagher is president; Joseph P. Kaiser, secretary-treasurer; August F. Fegert, vice president.

Foundry Changes Name

Lakey Foundry & Machine Co., Muskegon, Mich., changed its corporate name to Lakey Foundry Corp.

Texas Tubular Expanding

Equipment is being installed by Texas Tubular Products Co., Tyler, Tex., in its $175,000 Owentown plant. Operations are expected to begin in April. A total of 200 different sizes and shapes of pipe waste fittings and chrome and plated tubular drain pipes will be made.

AMF To Buy Leland Electric

American Machine & Foundry Co., New York, has an option to acquire all assets of Leland Electric Co., Dayton, O., which has plants in Dayton and in Guelph, Ont.

Incorporation Papers Filed

Charters of incorporation were filed with the secretary of state's office, Dover, Del., by Glasgow Mfg. Co., machinery, Bear, Del.; Eastern Machine & Tool Works Corp., machinery, parts, etc., Wilmington, Del.; Taylor & Messick Inc., machinery, Harrington, Del.; North American Brass & Copper Inc., with Harry Faimer, Wilmington, serving as resident agent; American Tool Corp., tools, with Mary W. Burton, Dover, serving as resident agent; Clark Cast Steel Cement Co., steel, with Vincent A. Theisen, Wilmington, serving as resident agent.

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Make this convincing test with*

IMMUNOL

Neutral, non - inflammable, odorless and non-toxic IMMUNOL added to any water will immunize that water against causing rust and at the same time makes a powerful detergent and wetting agent. Parts treated are protected by a clean, non-oily, invisible film.

*Add a small quantity of IMMUNOL to one of two jars containing plain water. Put a screw in each of the jars. Observe them after a day or a week. One screw will be rusted; the other in the IMMUNOL solution will be bright and clean.

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25 TO 50 TON CAPACITY

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STANDARD GAUGE FREIGHT CARS

Box, Single Sheathed, 50-Ton
Cabooses, Eight Wheel, Cupola Type
Flats, 50-Ton, Steel Underframe, 40'0"
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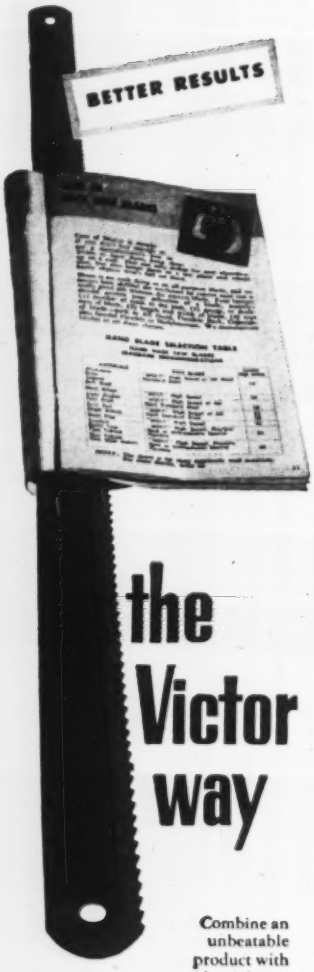

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To keep all bearings on its levelers functioning smoothly and efficiently, McKay employs Farval Centralized Lubrication. In fact, Farval has been standard equipment for many years on all the roller levelers and many other types of machines this company manufactures.

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FARVAL—*Studies in Centralized Lubrication*
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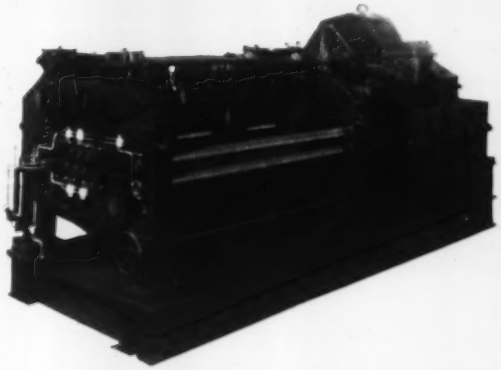

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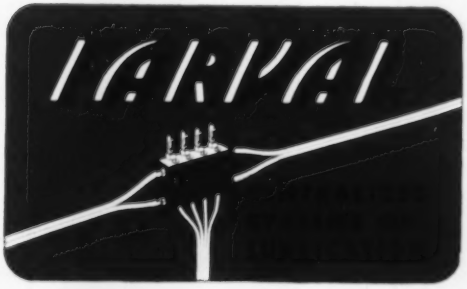
Photo above by courtesy of The McKay Machine Company.



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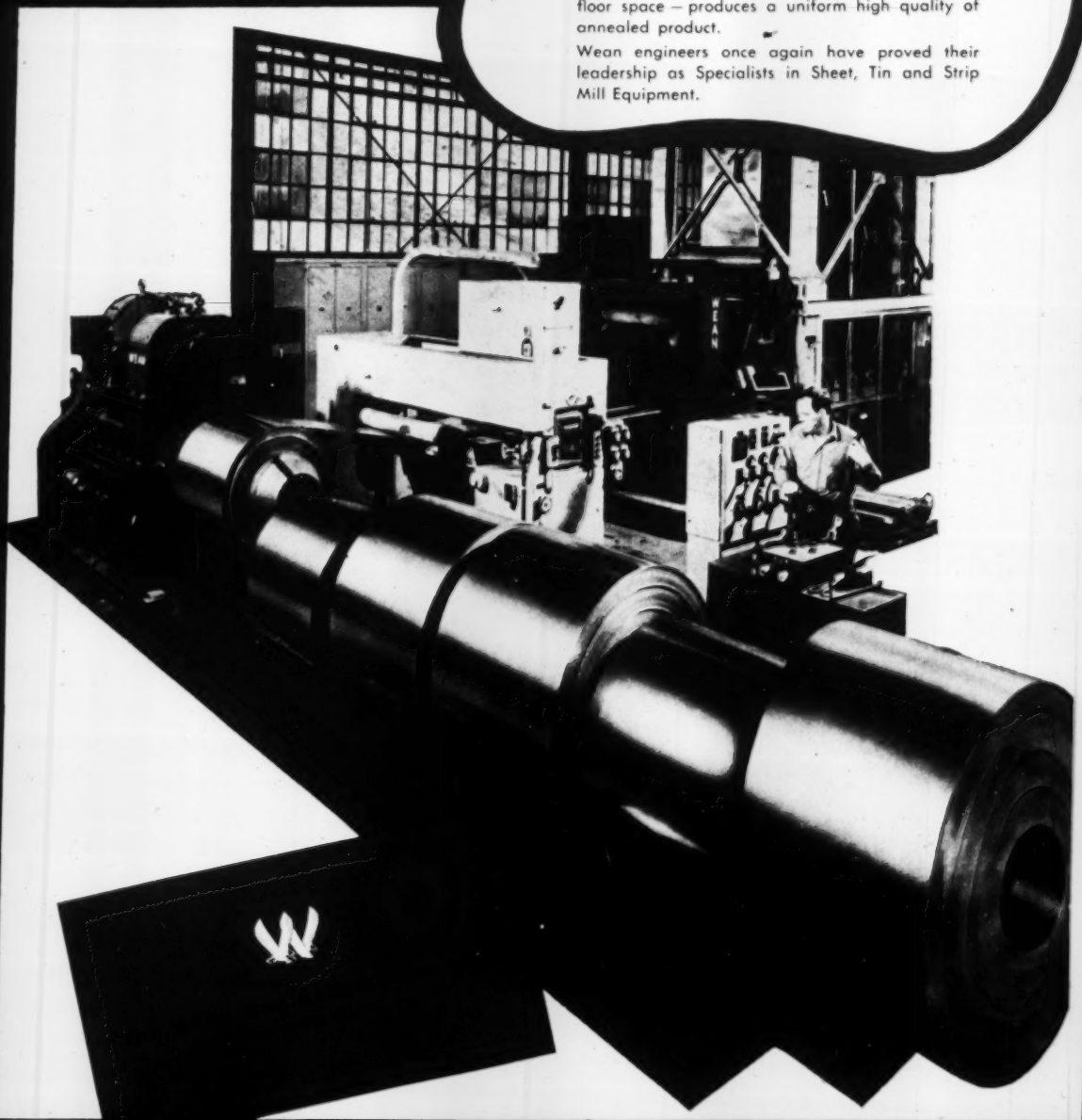

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